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BEFORE THE ARIZONA CORPORATION COMMISSION

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COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT.

DOCKET NO. WS-01303A-05-
W-01303A-05-0405

APPLICATION

APPLICATION OF ARIZONA-AMERICAN WATER COMPANY FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT

1. Arizona-American Water Company ("Arizona-American" or the "Company") hereby applies in accordance with A.R.S. § 40-250 and the Commission's Rule R 14-2-103 for a rate increase for its Paradise Valley Water District.

2. This rate increase is needed for three general reasons:

a. increased investment and changes in net revenue for the District in the seven years since the Company's last rate case in Docket No. W-01303A-98-0507;

b. to allow recovery through an Arsenic Cost Recovery Mechanism ("ACRM") of the Company's estimated $19 million investment in facilities needed to comply with the new federal standard for allowable arsenic levels in drinking water; and

c. to allow recovery through a Public Safety ("PS") surcharge of discretionary Company investments (expected to total $16 million through 2009) to improve fire flows in the District.

3. Arizona-American requests, as further described in the testimony of David P. Stephenson, that it be authorized by the final order in this docket to increase its annual rates by $0.278 million or 5.48%. This increase is required to recover normal increases in rate base and to compensate for changes in revenue and expense since the last rate case. Given the seven years since the Company's last rate filing, this increase amounts to less than one percent per year, or less than the annual inflation rate.

4. Arizona-American's expected arsenic-remediation and public-safety investments are extraordinary, both in the sense of "huge" and "unprecedented." From 2004 through 2009, Arizona-American proposes to invest $35 million in corporate funds to serve approximately 5,000 customers, or, on average, $7,000 per customer! Extraordinary investment demands require an extra-ordinary regulatory response.

5. The Company asks, as further described in the testimony of David P. Stephenson, that the final order authorize it to recover, through a Step-One PS surcharge, the Company's significant public-safety investments, including those completed to date and those actually completed by the time of the final order. This will increase annual rates by at $0.582 million or approximately 11%,

6. Arizona-American also requests that it be authorized to implement ACRM surcharges to recover its expected $19 million arsenic-remediation investment. This will require, as further described in the testimony of David P. Stephenson, additional filings by the Company to

demonstrate that the facilities have been placed in service and to provide the actual completed cost.

7. Arizona-American also requests that it be authorized to annually implement increases in the PS surcharge to recover each year's PS investments. The Company anticipates spending approximately $16 million to complete this program, likely by the end of 2009. Again, this will require, as further described in the testimony of David P. Stephenson, additional filings by the Company to demonstrate that the facilities have been placed in service and to provide the actual completed cost. The cumulative expected rate increase associated with this investment will be 39% through 2009.

8. Arizona-American also requests, as further described in the testimony of David P. Stephenson, two accounting orders to assist recovery of arsenic-remediation and public-safety investments through deferral of capital costs (depreciation and gross return) until the associated surcharge can go into effect.

9. Arizona-American also requests that, as further described in the testimony of David P. Stephenson, it be allowed to promote water conservation by imposing two surcharges on the highest consumption block: $2.00 per unit of water consumed, up to the last five percent of the total consumption; and $5.00 per unit of water consumed in the last five percent of the block.

10. Arizona-American also proposes, as further described in the testimony of David P. Stephenson, to equally share with its customers the gain realized from a recent property sale.

11. This Application is supported by the testimony and exhibits of nine witnesses:

a. <u>Paul G. Townsley</u>. Mr. Townsley is the President of Arizona-American as well as President of the entire Western Region of American Water, which includes American Water's regulated operations in five states. Mr. Townsley will testify concerning the importance of this case to the Company and the Commission. He will describe the steps taken by the Company to move from an adversarial, litigious, Commission relationship to one that instead partners with the Commission, the Residential Utility Consumer Office, local communities, and other constituents. He will summarize the Company's request. Finally, he will explain, from a senior-officer's perspective, Arizona's extraordinary investment requirements and why a fair return on equity is essential to attract investment to Arizona.

b. Dr. A. Lawrence Kolbe. Dr. Kolbe is a Principal of the Brattle Group. He will testify concerning the general principles necessary to properly determine a regulated entity's allowed return on its equity investment.

c. Dr. Michael J. Vilbert. Dr. Vilbert is also a Principal of the Brattle Group. He will apply the general principles elucidated by Dr. Kolbe to the case of Arizona-American to calculate an appropriate return on equity for the Company. Based on state-of-the-art financial theory, Dr. Vilbert calculates an appropriate authorized return on equity of 12 to 13%.

d. Joseph E. Gross. Mr. Gross is a Professional Engineer and serves as Arizona-American's Project Delivery Manager. Mr. Gross will discuss the technology selected for arsenic remediation in the Company's Paradise Valley Water District. He will also explain the Company's capital-budgeting process for major projects and support the expected costs for the Company's investments in both the arsenic-remediation and public-safety programs.

e. Brian K. Biesemeyer. Mr. Biesemeyer is also a Professional Engineer and serves as Arizona-American's Network General Manager. He will discuss why the

Company wishes to invest in facilities to improve public safety in the District, and demonstrate the extent of the Company's outreach to the community and the strength of local support for the public-safety investments.

f. David P. Stephenson. Mr. Stephenson is the Western Region's Rates Regulation Manager. He will sponsor most of Arizona-American's required schedules and will specifically support the Company's:

i. Requested general rate increase, including rate base and associated adjustments, the cost of capital (excluding return on equity), adjustments to certain test-year expenses,

ii. Proposed ACRM surcharges;

iii. Proposed PS surcharges;

iv. Requested Accounting Orders;

v. Proposed Conservation Rate Design; and

vi. Gain-sharing proposal.

g. Stacey A. Fulter. Ms. Fulter is employed in the Western Region as an Intermediate Financial Analyst in the Rates and Revenue Department. She will testify concerning rate case expenses, General Office allocations, and pro-forma adjustments enumerated on Schedule C-2 relating to the Company's Miller Road Treatment Facility.

h. Ralph A. Jordan. Mr. Jordan is employed by American Water Shared Services Center ("SSC") as a Financial Analyst in the Rates and Regulation Department.[1] He will testify as to certain revenue adjustments, including revenue from Paradise Valley Country Club, and will sponsor Schedules E-7 and C-2.

[1] The SSC is an at-cost service provider to the operations of the American Water system.

i. David L. Weber. Mr. Weber is also an SSC employee and serves as a Senior Financial Analyst in the Rates and Regulation Department. He will generally support Schedules C and E and focus primarily on certain pro-forma adjustments enumerated on Schedule C-2, including Operating Revenues and Operations and Maintenance Expenses, Depreciation Expense, Payroll Taxes, Property Taxes, State and Federal Income Taxes, and Interest Expense.

j. Thomas J. Bourassa. Mr. Bourassa is a certified public accountant. He will testify concerning the Company's requested rate design. Mr. Bourassa has not yet completed his testimony, so Arizona-American will shortly supplement this Application with Mr. Bourassa's testimony and his sponsored Schedules G and H.

Requested Relief. Arizona-American Water Company asks that the Commission issue an order consistent with the requests set forth in this Application, as more fully set forth in the accompanying testimony, exhibits, and schedules.

Respectfully submitted on June 3, 2005, by:

Craig A. Marks

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By: ______________________
Joel Reiker

TOWNSLEY

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
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IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY DISTRICT

DOCKET NO. W-01303A-05-____

DIRECT TESTIMONY
OF
PAUL G. TOWNSLEY
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

DIRECT TESTIMONY
OF
PAUL G. TOWNSLEY
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
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I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND TELEPHONE NUMBER.

A. My name is Paul G. Townsley. My business address is 303 H Street, Suite 205, Chula Vista, California 91910. My telephone number is (619) 409-7700.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I have been employed since 2002 by American Water Works Service Company ("American Water") as President of its entire Western Region. As part of my responsibilities, I also serve as the President of Arizona-American Water Company ("Arizona-American" or the "Company"). I also serve as the President of the four other regulated American Water subsidiaries in the Western Region: California-American Water, Hawaii-American Water, New Mexico-American Water, and Texas-American Water.

Q. WHAT ARE YOUR RESPONSIBILITIES AS PRESIDENT OF AMERICAN WATER'S WESTERN REGION?

A. As President, I am responsible, among other things, for maintaining the five-state water and wastewater utilities' financial health; enhancing the operating efficiency and reliability of the business; and for assuring that all functions (e.g. planning, engineering, construction, production, distribution, customer service, accounting, regulatory and human resources) are carried out in compliance with all local, state, and federal laws and regulations, and standards of good business practice. I am also ultimately responsible for assuring that we meet our customers' needs. I am also responsible for American Water's unregulated operations in the Western Region.

Q. BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I received a Bachelor of Science degree in Mechanical Engineering from the United States Merchant Marine Academy in 1980. I am a registered Professional Engineer in the states of Arizona and Hawaii. Before serving as American Water's President, Western Region, I was employed by Citizens Utilities Company in a variety of positions spanning twenty years. My more recent roles with Citizens Utilities included Vice President, Citizens Water Resources; Vice President, Arizona Energy; Vice President, Arizona Electric; and Vice President, Mohave Sector.

Q. HAVE YOU TESTIFIED BEFORE ANY STATE UTILITY REGULATORY AGENCIES?

A. Yes, however, it is not typical for me now in my current position. I am testifying in this case because it is especially important to Arizona-American's future, as this rate case is but the first of a number of upcoming rate cases for our water and waste water districts in Arizona.

Q. PLEASE DESCRIBE ARIZONA-AMERICAN AND ITS PARADISE VALLEY WATER DISTRICT?

A. Arizona-American is a Class-A regulated water and wastewater utility, serving approximately 131,000 Arizona residential, commercial, irrigation, and industrial customers. Our Paradise Valley Water District serves approximately 5000 customers in portions of Paradise Valley, Scottsdale, and unincorporated Maricopa County.

II. <u>IMPORTANCE OF THIS CASE</u>

Q. WHY IS THIS CASE SO IMPORTANT?

A. In my testimony, I summarize the Company's request and provide senior management's perspective on the major components of the request. This case is the Company's first filed base-rate case since the Commission established a three-year rate case filing moratorium as a condition of the acquisition of American Water by RWE. The Paradise Valley rate case is the first of many water and wastewater rate cases the Company must file in Arizona over the next several years. It is also the first case we have filed in Arizona since the Commission authorized only a nine percent return on equity in our last general rate case. It is my top priority in this first case to clearly justify and successfully explain our request and to be sure that we conduct this case in a most professional manner.

Q. THE RATE MORATORIUM DOESN'T EXPIRE UNTIL JANUARY 2006; HOW IS THE COMPANY ABLE TO FILE THIS CASE NOW?

A. I have the Commission to thank for our ability to file this case in 2005. We determined that we needed to substantially improve our working relationship with the Commission, Staff, and the Residential Utility Consumer Office ("RUCO"). We had a number of very candid discussions with the Commissioners, Staff, and RUCO. From these discussions, we learned several valuable lessons:

1. Arizona-American needed to view the Commission and RUCO not as adversaries, but as partners in the enterprise of providing safe, reliable, and affordable water and wastewater service to our customers, who are also the Commission's and RUCO's customers.
2. Arizona-American needed to be more closely involved with its communities. We needed to listen better to community leaders and our customers and then mutually craft solutions to specific community issues.
3. Arizona-American needed to develop and rely on a professional, Arizona-based, in-house rate/regulatory staff. A goal was to reduce regulatory expense without sacrificing quality, while improving regulatory relations.

Q. HAVE YOU BEEN ABLE TO PARTNER WITH THE COMMISSION AND RUCO?

A. Yes. As an example, we are able to file this case now because the Company, the Commission, and RUCO all recognized the challenge Arizona water companies faced because of the new federal arsenic standards, which, by January 2006, reduce the allowable concentration in drinking water of arsenic (a known carcinogen) from 50 to not more than 10 parts per billion. To achieve these reductions, Arizona investor-owned and municipal water suppliers need to invest hundreds of millions of dollars in new arsenic-remediation facilities. To encourage these needed investments by the utilities under its jurisdiction, the Commission developed an innovative arsenic cost recovery mechanism ("ACRM"). However, the Company's pending appeals of earlier Commission decisions were a barrier to implementing ACRMs for three of its Districts, and the Commission's rate-filing moratorium would have precluded implementing an ACRM for our Paradise Valley Water District. Following discussions with Staff and RUCO, Arizona-American offered to dismiss all pending appeals of Commission orders if the Commission would waive its filing moratorium to the extent necessary to allow the Company to seek ACRMs for its arsenic-remediation investments. The Commission accepted this offer and granted the Company the opportunity to request timely rate recovery of our extraordinary costs to comply with the new standard for arsenic. We are currently seeking ACRM approval for our Agua Fria, Sun City West, and Havasu Water Districts in Docket Nos. W-1303A-05-0280 *et. al.* The Paradise Valley Water docket now provides us the opportunity, among other things, to recover the cost of our arsenic-remediation investment in this District.

Q. HAVE YOU BEEN ABLE TO PARTNER WITH YOUR COMMUNITY LEADERS AND CUSTOMERS?

A. Yes. In this case we will present the results of one very successful partnership: the Paradise Valley Fire-Flow Improvement Program. A particular fire-flow capability has not historically been required for Arizona's regulated utilities. Nevertheless, as more thoroughly discussed in Mr. Biesemeyer's testimony, we worked for several years with Town leaders and residents to develop a capital-investment program to improve hydrant pressures and flows. We are quite proud of the program we have developed, but now we need to partner in turn with our regulators to develop a mechanism to encourage this discretionary investment.

We have just completed a similar process in our Sun City Water district, where we have worked with community leaders, residents of Sun City and Youngtown , and the Commissioners to develop a fire-flow improvement plan, which we filed with the Commission in May.

Q. WHAT HAVE YOU DONE TO DEVELOP A PROFESSIONAL, ARIZONA BASED, RATE/REGULATORY STAFF?

A. I am very proud of the team we have assembled. Arizona-American now employs an outstanding staff, with the necessary legal, regulatory, and governmental-relations expertise to lead these efforts in Arizona. We also recently added a community-affairs specialist, who is also an elected municipal representative, which significantly upgrades our ability to partner with community leaders throughout our service territories.

III. NEED FOR RATE CASE

Q. WHY IS THIS RATE CASE NECESSARY?

Even though there has not been a rate case filed in Paradise Valley since 1998 and there is some inflation every year, this case is first and foremost about improving the public health and safety for our customers in Paradise Valley. We will improve public health as a result of removing more arsenic from drinking water and we will improve public safety as a result of improved water pressures and flows for fire-fighting.

Q. PLEASE SUMMARIZE THE COMPANY'S RATE REQUEST.

A. Effective upon a final order in this case, the Company requests an immediate increase in annual base rates of $0.278 million or 5.48%, plus authority to implement a five-step Public-Safety ("PS") surcharge to fund water-flow improvements for fire protection in Paradise Valley. We are asking that the Step-One PS surcharge become effective upon a final order in this case. We estimate that the Step-One PS surcharge will increase rates by $0.582 million or approximately 11%,

Additionally, the Company requests approval of a two-step ACRM surcharge, based on earlier Commission precedent. The estimate for the first year's eligible revenue requirement for the new arsenic removal facility is $3.477 million, to be recovered through an ACRM surcharge. The exact amounts of the Step-One increases for the PS and ACRM surcharges will be known when the Company has completed specific fire-flow projects and the arsenic removal project and they are operating as intended and the Company files for specific Step-One PS Surcharge and Step-One ACRM increases based on actual costs. The ACRM is intended to become effective on customer bills 45 to 90 days following a specific step increase request.

Given that there is uncertainty associated with both the length of this rate case and the construction schedule for the arsenic removal and fire flow projects in Paradise Valley, the Company also requests accounting orders to defer depreciation and gross return as described more fully in the testimony of David P. Stephenson.

Q. WHEN DOES THE COMPANY PLAN TO REQUEST STEP ONE OF THE ACRM SURCHARGE?

A. Timing of the Step-One ACRM surcharge will depend on the arsenic facility's completion schedule. It is possible that the Company may be in a position to file the specific ACRM Step-One request sometime during the conduct of the case. We would ask that the Step-One ACRM surcharge occur as quickly as possible after the final order. We will facilitate that result by providing the specific ACRM Step-One schedules as soon as they are available.

Q. WHY IS THE COMPANY REQUESTING THAT STEP-ONE OF THE PS SURCHARGE BECOME EFFECTIVE UPON A FINAL ORDER IN THIS CASE?

A. We are asking for a specific Step-One PS surcharge at the time of the final order in this case because, as Mr. Joseph E. Gross explains, several discrete fire protection projects are already complete and were placed in service in March 2005. Also, several additional discrete fire protection projects are appropriate to include in the Step-One PS surcharge, because they are already in design or under construction and will be complete and placed in service before this case is completed. This request includes the recovery of deferred depreciation and gross return for completed fire flow projects from the effective date of an accounting order until the effective date of a final order in this case. Details of the already completed projects are contained in Mr. Gross' testimony. He will provide additional specific details of the additional projects upon their completion and at the appropriate time in this case.

We estimate the following cumulative percentage rate increases for Steps One through Five of the PS surcharge are:

Step 1	11%
Step 2	21%
Step 3	25%
Step 4	31%
Step 5	39%

The rate calculations and other details for the PS surcharge are provided in the testimony of Mr. David P. Stephenson.

As with the ACRM, the Company requests that an accounting order be approved for the PS surcharge for the deferral of depreciation and gross return on facilities already in service from the date an accounting order is approved until the Step-One PS surcharge is effective. Likewise, the Company requests that the accounting order permit inclusion of PS projects now underway once they are placed in service. The Company requests that the PS accounting order be approved immediately, because we are already depreciating PS-eligible projects.

Q. WHEN DOES THE COMPANY PROPOSE TO PLACE THE ACRM AND PS SURCHARGES INTO BASE RATES?

A. The Company plans to file its next Paradise Valley base rate case by May 2010 or about four years following an anticipated final order in this case. We expect that the ACRM surcharge, and probably the PS surcharge, would end after a final order in this case, which would include the project costs in base rates.

IV. <u>NEED TO ATTRACT INVESTMENT</u>

Q. WHAT RETURN ON EQUITY IS THE COMPANY REQUESTING?

A. The Company's requested revenues are based on a 12% authorized return on equity. The return on equity currently approved in Paradise Valley is 11%. However, in the most recent series of rate cases involving a large number of the Company's other water and waste water districts, the Commission approved a disappointingly low 9% return on equity. As of the date of this filing, 9% continues to be the *lowest* authorized return on equity level in effect for *any* of American Water's 27 state affiliates. Arizona's growing economy and needed high levels of investment in infrastructure should make Arizona an attractive investment opportunity. However, the message my parent company received was that other states are much more receptive to investment capital.

Q. AS THE WESTERN REGION'S MOST SENIOR OFFICER, WHAT IS YOUR INITIAL PERSPECTIVE ON THE REQUESTED AND PREVIOUSLY AUTHORIZED RETURNS?

A. My perspective is shaped primarily by the significant need and desire to attract capital for worthwhile water and wastewater projects in Arizona. This need is compounded because the Company must refinance $165.6 million of outstanding debt in 2006. While Arizona-American is required by an unfunded federal mandate to build the Paradise Valley arsenic removal facility, it is not, on the other hand, required to fund fire-flow improvement projects.

Unfortunately, I find myself now at a competitive disadvantage when seeking to obtain corporate capital to fund discretionary projects that benefit Arizona customers. Reducing regulatory lag and increasing our authorized return on equity will enable the Company to continue to invest the amounts of capital necessary to meet not only current and future mandated needs, but also non-mandated projects requested by our customers. Until I am able to both reduce regulatory lag (via the proposed PS surcharge) and obtain a fair authorized rate of return, I do not anticipate obtaining approval to continue funding the Paradise Valley public-safety projects.

Q. TURNING MORE GENERALLY TO ARIZONA, WHAT OTHER CONCERNS DOES SENIOR MANAGEMENT HAVE?

A. While my parent company's concerns are many, they include the timely and full recovery of invested capital at a fair rate of return. This is a particular concern in Arizona. Over the period, 2005-2009, American Water may invest up to $1,625 million in its 27 state affiliates. In Arizona, my team identified mandated, necessary, and desirable projects which can absorb net investment of $230 million of the above nation-wide total over the same period. In other words, Arizona could absorb 14% of American Water's entire capital budget, yet it has only 4% of the current American Water customer base of 3.5 million customers.

Q. HOW CAN ARIZONA REQUIRE SO MUCH OF AMERICAN WATER'S CAPITAL?

A. Approximately $40 million of the $230 million total is for arsenic remediation. Roughly $20 million is for improved fire flows in Paradise Valley and Sun City / Youngtown. A significant amount is for moving surface water over greater distances to our communities to save ground-water supplies and for new wastewater treatment plants. And several of Arizona-American's communities, built largely in the 1960's and 1970's, now need new wells and infrastructure repaired and replaced.

Q. ISN'T CUSTOMER GROWTH THE PRIMARY REASON FOR SPENDING 14% OF AMERICAN WATER'S CAPITAL IN ARIZONA?

A. No. Over 2005-2009, developers expanding in our communities are anticipated to contribute or advance $164 million for water infrastructure. In other words, our potential net investment of $230 million in Arizona is already reduced by $164 million for meeting growth.

Q. YOU HAVE DISCUSSED EQUITY RETURNS, ARE THERE ANY ISSUES CONCERNING THE COMPANY'S REQUESTED COST OF DEBT?

A. Yes. The Company is able to obtain new debt from American Water at better interest rates than what the Company could get on its own. The Company has reflected current known and measurable borrowing costs in its revenue requirements for that portion of the cost of debt it will refinance in November 2006. Mr. Stephenson further discusses this issue in his testimony.

V. OTHER MATTERS

Q. DOES THE COMPANY'S REQUEST ENCOURAGE WATER CONSERVATION?

A. Yes. This rate case is another opportunity to evaluate existing rate designs and consider incentives and programs for conservation. It is my understanding that per-capita water consumption in Paradise Valley is much higher than virtually anywhere else in Arizona and far above the presently non-binding per-capita target set by the Arizona Department of Water Resources. Because of the affluence of large portions of our Paradise Valley customer base, establishing pricing signals to actually reduce water usage is a significant challenge.

The median household income in Paradise Valley, as reported in the 2000 US Census, was $150,228 as compared to $40,558 for Arizona as a whole. The 2000 Census also reported the median value of owner-occupied housing in Paradise Valley was $722,700, compared to $121,300 for Arizona as a whole. The average household size in Paradise Valley was 2.71 persons in 2000, which is nearly the same as the Arizona 2.64 person average. Over 38% of Paradise Valley households had annual income in excess of $200,000 in the 2000 Census. Statistics such as these will be useful in attempting to create pricing signals that actually reduce water use. Mr. Stephenson's testimony includes a conservation proposal for the parties to consider. Mr. Bourassa will provide more details about this proposal.

Q. WAS THE CAP SURCHARGE IN PARADISE VALLEY REDUCED IN 2005?

A. Yes, it was reduced from $0.19 per 1000 gallons in 2004 to $0.07 per 1000 gallons in 2005 as per normal operation of this existing surcharge. From the perspective of our customers in Paradise Valley, this was a rate decrease.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes it does.

STEPHENSON

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT.	DOCKET NO. W-01303A-05-

DIRECT TESTIMONY
OF
DAVID P. STEPHENSON
ON BEHALF OF
ARIZONA-AMERICAN WATER COMPANY
JUNE 3, 2005

DIRECT TESTIMONY
OF
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EXHIBITS

SCHEDULES

I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is David P. Stephenson and my business address is 4701 Beloit Drive, Sacramento, CA 95838.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by American Water Works Service Company ("Service Company") as the Rates Regulation Manager for the Western Region of American Water Works Company ("American Water").

Q. WHAT ARE YOUR RESPONSIBILITIES WITH THE WESTERN REGION OF AMERICAN WATER?

A. I am responsible for preparing, filing, and processing requests for rate adjustment, financing, acquisition or any other applications before the state public utility regulatory agencies in each Western Region jurisdiction. Presently, the states in which American Water Western Region subsidiaries provide regulated utility service are Arizona, California, Hawaii, New Mexico, and Texas.

Q. BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I received a Bachelor of Science in Business Administration, with an emphasis in Accounting from San Diego State University. Additionally, I have attended and instructed various seminars on different aspects of the water industry, including the Bi-annual Utility

Rate Seminar sponsored by the National Association of Water Companies (NAWC) for members of the National Association of Regulatory Utility Commissioners (NARUC) and their staff.

Q. HAVE YOU TESTIFIED BEFORE ANY REGULATORY AGENCIES?

A. Yes. I have testified on numerous occasions before public utility regulatory agencies in the states of Arizona, California and New Mexico. I also participated in regulatory matters before the public utility regulatory agency for the state of Hawaii and I am currently participating in two applications pending before the public utility regulatory agency in the state of Texas.

Q. WHAT ARE YOUR RESPONSIBILITIES IN THIS PROCEDING?

A. I am generally responsible for the preparation and coordination of this application, including supervision of internal staff, coordination of outside consultants, and coordination of activities between other Service Company employees.

Q. WHAT ISSUES DO YOU ADDRESS IN YOUR TESTIMONY?

A. I address several issues and specific adjustments in this general rate case application for the Paradise Valley District of Arizona-American Water Company ("Arizona-American" or the "Company"). Those issues include Paradise Valley's rate base and associated adjustments, the cost of capital (excluding return on equity), adjustments to certain test-year expenses, Arizona-American's request for Arsenic Cost Recovery Mechanism

("ACRM") and Public Safety ("PS") surcharges; a request for high block surcharges to be accounted for as a contribution, and gain on sale issues. Additional support for other proposed adjustments to revenues and expenses will be provided by outside consultants, and employees of Service Company and Arizona-American.

Q. WHY IS ARIZONA-AMERICAN FILING A GENERAL RATE CASE FOR PARADISE VALLEY AT THIS TIME?

A. Arizona-American is currently in the process of investing over $40 million in new facilities in its service territory, including over $19 million in Paradise Valley, in order to comply with the U.S. Environmental Protection Agency's ("EPA") new arsenic containment standard for drinking water. In connection with this undertaking, Arizona-American will incur significant on-going operating and maintenance expenses. Recovering at least a portion of these costs on a timely basis, rather than waiting for delayed recovery through a future general rate case, is important to maintaining the financial health of Arizona-American, as I am sure it is equally important to the financial health of other water utilities facing the same situation. Therefore, Arizona-American is requesting approval in this proceeding of an ACRM to recover a portion of these costs.

Because the record in Paradise Valley's previous general rate case (Decision 61831, dated July 20, 1999) is too stale to be reopened for the purpose of addressing this issue, and because Arizona-American is currently under-earning in Paradise Valley, the Company is filing a general rate case at this time. Additionally, Arizona-American is requesting that the Commission issue an interim accounting order in this proceeding approving the deferral of capital costs (depreciation and gross return) related to arsenic-removal facilities placed into service in Paradise Valley prior to the ACRM going into effect. Arizona-American anticipates filing an ACRM Step 1 increase shortly after the final decision in this case.

Additionally, Arizona-American is currently in the process investing over $16 million in Paradise Valley to improve fire flows. Arizona-American is requesting approval of a Public Safety ("PS") surcharge) mechanism for the purpose of recovering all capital related costs for fire flow improvements completed through the first quarter of 2006, to become effective on the same date as new base rates approved in this proceeding, Additionally, Arizona-American is requesting that the Commission issue an interim accounting order in this proceeding approving the deferral of capital costs (depreciation and gross return) related to PS improvements placed into service in Paradise Valley prior to the surcharge going into effect. The PS surcharge will be adjusted annually for future plant additions.

Q. WHEN DOES ARIZONA AMERICAN PLAN TO FILE ITS NEXT RATE CASE FOR PARADISE VALLEY?

A. Once implemented, the ACRM and PS surcharges should reduce the need to file several rate cases in the near-term to recover costs related Arizona-American's capital plan.

Therefore, Arizona-American presently plans to file its next general rate case for Paradise Valley not later than May 2010.

II. GENERAL RATE CASE ISSUES

A. RATE BASE

Q. PLEASE EXPLAIN HOW THE COMPANY ARRIVED AT ITS TEST YEAR ORIGINAL COST RATE BASE OF $11,651,216, SHOWN ON SCHEDULE B-1, LINE 12.

A. The Original Cost Rate Base ("OCRB") was calculated by establishing the balance of Utility Plant in Service ("UPIS") as of December 2004, per the Company's books. Typical rate base deductions (accumulated depreciation, contributions, etc.) and additions (working capital, etc.) were then calculated to arrive at the actual end of test year rate base of $15,253,666, shown in column (a), line 12 of Schedule B-2. Finally, the Company made various pro forma adjustments totaling negative ($3,602,449) to the actual end of test year rate base to arrive at its adjusted end of test year rate base of $11,651,216.

Q. PLEASE EXPLAIN THE COMPANY'S PRO FORMA ADJUSTMENTS SHOWN ON SCHEDULE B-2.

A. The adjustments shown on Schedule B-2 are:

ADJUSTMENT (1): $73,781. Adjustment (1) increases UPIS to reflect Paradise Valley's allocation of the capital costs of: 1) the Arizona-American corporate office, located in

Phoenix and 2) the Arizona-American Central District office, located in Sun City. These offices were first allocated to Arizona-American and Service Company based on the ratio of Arizona-American employees to Service Company employees residing in the complex. A portion of the Service Company allocation was then allocated to the Western Region operating companies, including Arizona-American, based on year-end customers. Finally, the Arizona-American allocation was allocated to Paradise Valley based on year-end customers.

ADJUSTMENT (2): ($3,646,198). Adjustment (2) removes construction work in progress ("CWIP") from net UPIS. CWIP at the end of the test year includes arsenic removal and fire flow projects.

ADJUSTMENT (3): $30,033. Adjustment (3) increases accumulated depreciation to reflect accumulated depreciation related to Adjustment (1).

B. <u>COST OF CAPITAL</u>

Q. WHAT CAPITAL STRUCTURE DOES ARIZONA-AMERICAN PROPOSE?

A. The Company proposes a capital structure comprised of 63.3 percent debt and 36.7 percent equity, as shown in Schedule D-1.

Q. HOW WAS THIS PROPOSED CAPITAL STRUCTURE DETERMINED?

A. The Company's proposed capital structure reflects Arizona-American's actual balances of debt and equity as of December 2004, as reflected in Schedule E-1.2.

Q. WHAT COST OF DEBT DOES ARIZONA-AMERICAN PROPOSE?

A. Arizona-American proposes a 5.42 percent cost of debt, shown in Schedule D-2.

Q. HOW WAS THE PROPOSED COST OF DEBT DETERMINED?

A. The proposed cost of debt reflects the weighted average cost of Arizona-American's notes and bonds as of December 2004, adjusted to reflect the November 2006 refinancing of the November '01 series, and the January '02 series bonds.

Q. WHY DID THE COMPANY ADJUST THE COST OF THESE BONDS?

A. The Company adjusted the cost of these bonds because they become due and payable and must be refinanced in November 2006. These bonds will be refinanced at the current 2005 market rate, which is a higher rate, and that rate should be recognized in determining the Company's cost of service. The new interest rate reflects the current borrowing rate for American Water Capital Corporation ("AWCC"), which is approximately 70 basis-points above the current yield on U.S. Treasury securities of equivalent maturity. AWCC is currently rated A by Standard & Poor's and Baa1 by Moody's. As of April 15th, 2005, the average yield on A-rated and Baa-rated utility bonds was 5.74 percent.[1]

For the week ending March 28, 2005, the Federal Reserve's average calculated rate for a Treasury security with a constant maturity of twenty years was 5.01 percent. To this rate, the Company added 70 basis points to arrive at the adjusted rate of 5.71 percent applied to the bonds listed on lines 4 and 5 of Schedule D-2. No adjustment was made for issuance costs.

Q. WHAT IS ARIZONA-AMERICAN'S PROPOSED RATE OF RETURN ON EQUITY ("ROE") AND RESULTING PROPOSED OVERALL RATE OF RETURN ("ROR")?

A. Arizona-American proposes a 12.0 percent ROE, which is based on the findings of Dr. A. Lawrence Kolbe (12 percent to 13 percent), and supported by the analysis of Dr. Michael J. Vilbert, both of The Brattle Group. Our resulting proposed overall ROR is 7.84 percent, as shown in Schedule D-1.

Q. WHY IS ARIZONA-AMERICAN COMPANY REQUESTING AN AUTHORIZED ROE AT THE LOW END OF THE EQUITY COST RANGE ESTIMATED FOR PARADISE VALLEY BY DR. KOLBE?

A. Dr. Kolbe has proposed a range in his findings on ROE of 12 percent to 13 percent, and recommended the mid-point of this range, or 12.5%. The Company agrees with this finding, and in most instances would accept this recommendation. However, in this case, the Company has decided to use the low end of the range to minimize contentious issues.

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[1] Value Line Selection & Opinion April 15, 2005.

Q. HOW DOES ARIZONA-AMERICAN'S OVERALL COST OF CAPITAL AND PROPOSED RATE OF RETURN COMPARE TO RETURNS RECENTLY AUTHORIZED FOR WATER UTILITIES IN ARIZONA?

A. The 7.84 percent rate of return we are proposing in this case is lower than the average rate of return (8.2%) awarded by this Commission since late 2002. (See Table 1)

Table 1[2]

Decision No.	Date	Approved ROR
65350	11/01/02	8.1%
66782	02/13/04	9.1%
66849	03/19/04	8.7%
67093	06/30/04	6.5%
67279	10/05/04	8.7%
67455	1/04/05	8.1%
Average		8.2%

Excluding Arizona-American's 6.5 percent rate of return allowance in Decision No. 67093, the proposed ROR in this case is lower than any of the returns listed in Table 1. This lower proposed rate of return is the result of a combination of the requested ROE, which is at the low end of Dr. Kolbe's range, and our low cost of debt.

Q. WHAT IS MEANT BY LOW COST OF DEBT?

A. Because the majority of Arizona-American's debt is issued internally by our affiliate AWCC, our cost of debt is lower than it would otherwise be. In other words, if Arizona-

[2] As of April 2005. Includes Class A and B water/wastewater utilities. Excludes decisions based on separate negotiated settlement agreements.

American were spun-off and/or forced to issue 100 percent of its debt to outside lenders, the cost of that debt would be significantly higher than it is currently.

Q. WHY WOULD THE COST OF DEBT BE HIGHER?

A. The reason the debt cost would be higher is because Arizona-American would not be an A or Baa-rated company, as AWCC is. On a stand-alone basis, Arizona-American would probably be rated poorly. In fact, at the end of 2004 Arizona-American's outside lender, CoBank, downgraded Arizona-American from a "4" risk rating to a "7" risk rating. CoBank assigns a risk rating to each of its borrowers as part of their pricing and credit underwriting process. They currently use a 14-point scale, with 1 being the highest credit quality. According to CoBank, the main driver in the deterioration in the creditworthiness of Arizona-American has been the inability of operating cash flow to keep pace with the amount of debt capital that has been required to meet capital requirements in the service territory. As a result, Arizona-American's cost of debt would significantly increase if new debt was required from CoBank. As of May 6, 2005, CoBank instructed the Company that its borrowing rate was 7.10%.

Q. DOES THE FACT THAT ARIZONA-AMERICAN AND ITS CUSTOMERS BENEFIT FROM A LOWER EMBEDDED COST OF DEBT JUSTIFY AN ROE LOWER THAN WHAT THE COMPANY WOULD OTHERWISE RECEIVE?

A. No. Such an outcome would not constitute a fair return. Messrs. Kolbe and Vilbert address the appropriate ROE in their testimonies.

Q. DOES THE COMPANY BELIEVE IT WILL HAVE THE OPPORTUNITY TO EARN ITS AUTHORIZED RETURN?

A. No, for several reasons. As I discuss below, Arizona-American is currently in the process of investing over $35 million in new facilities in Paradise Valley to comply with the EPA's new arsenic containment standard for drinking water and to improve public safety. The Company has requested approval of ACRM and PS surcharges to recover a portion of the costs related to these projects. However, the Company will incur significant on-going operating and maintenance expenses related to arsenic treatment, which has not been requested for recovery for at least one year after incurrence or until the next general rate case. Additionally, the PS surcharge has regulatory lag automatically built in as part of the recovery (i.e. – the surcharge is only adjusted annually for all construction that may be finalized throughout the year).

While I believe the partial cost recovery mechanisms proposed below are a step in the right direction, certain aspects of Arizona rate setting, such as the use of an historic test year and the inability to recover significant expense increases in the absence of a general rate case lead me to believe that regulated water utilities in Arizona likely cannot expect to earn their authorized return, on average, without significant customer growth. The fact that Paradise Valley did not earn its authorized return at all during the 1990s, despite having filed five rate cases during that period, is further evidence that the Company - and utility investors in Arizona for that matter - do not believe they can earn the authorized rate of return under traditional Arizona ratemaking arrangements.

Q. HAVE YOU PREPARED AN EXHIBIT SHOWING AUTHORIZED AND EARNED RETURNS FOR PARADISE VALLEY?

A. Yes. Exhibit DPS-1 shows authorized and earned returns for Paradise Valley from 1991 to 2001.[3] During that period, Paradise Valley fell short of its overall authorized rate of return by a total of approximately $1.4 million and its equity investors under-earned by a total of approximately $2.6 million.

C. <u>TEST YEAR EXPENSE ADJUSTMENTS</u>

Q. PLEASE EXPLAIN THE EXPENSE ADJUSTMENTS YOU SPONSOR ON SCHEDULE C-1

A. The adjustments I sponsor on Schedule C-1 are:

ADJUSTMENT D-1: ($60,527). Adjustment D-1 normalizes test year net depreciation and amortization expense to reflect the Company's adjusted UPIS. Depreciation expense was calculated by multiplying adjusted UPIS and corporate-allocated plant account balances by their assigned depreciation rates. Contribution depreciation was calculated in the same manner and subtracted from depreciation expense to arrive at net depreciation expense of $681,374. Test year amortization of CPS and Mummy Mountain acquisition costs of $32,634 and $6,570, respectively, were then added to normalized net depreciation expense to arrive at normalized net depreciation and amortization expense of $720,578.

ADJUSTMENT E-1: ($14,879). Adjustment E-1 normalizes test year property tax expense to reflect Staff's property tax calculation methodology. A three-year average of revenues was multiplied by two and reduced by the book value of transportation equipment to arrive at an estimate of full cash value. The assessment ratio of 25 percent was then applied to the full cash value to arrive at an assessed value of $2,579,437. The assessed value was then multiplied by Paradise Valley's effective property tax rate of 8.24 percent to estimate initial property tax expense of $212,427. Test year taxes on parcels of $814 were then added to initial property tax expense to arrive at total normalized property tax expense of $213,241.

ADJUSTMENT G-1: ($22,449): Adjustment G-1 normalizes State income taxes to reflect all adjustments included in the application.

Adjustment G-2: ($101,905): Adjustment G-2 normalizes Federal income taxes to reflect all adjustments included in the application.

ADJUSTMENT H-1: ($66,439): Adjustment H-1 removes AFUDC earnings from the test year to reflect the removal of CWIP from rate base.

[3] Prior to 2002, Arizona American's operations included only the Paradise Valley district.

ADJUSTMENT I-1: ($134,592): Adjustment I-1 normalizes interest expense to reflect synchronized interest. The Paradise Valley District is a division of Arizona-American, and as such, does not have its own separate and distinct capitalization. Therefore, synchronized interest expense was calculated by multiplying Arizona-American's weighted cost of debt of 3.43 percent, as shown in Schedule D-1, by the Company's rate base of $11,651,216, to arrive at a normalized interest expense of $399,637

III. ARSENIC COST RECOVERY MECHANISM

Q. WHAT IS ARIZONA-AMERICAN'S REQUEST IN THIS PART OF THE PROCEEDING?

A. Arizona-American is requesting approval of an ACRM for Paradise Valley. Additionally, Arizona-American is requesting that the Commission issue an interim accounting order in this proceeding approving the deferral of capital costs (depreciation and gross return) related to arsenic-removal facilities placed into service in Paradise Valley prior to the ACRM going into effect. Once approved, Arizona American will make a series of filings for specific ACRM surcharge step-increases based on actual capital costs and recoverable deferred and recurring operating and maintenance expenses.

Q. WHY IS ARIZONA-AMERICAN MAKING THIS REQUEST?

A. As mentioned previously, Arizona American is in the process of investing over $19 million in new facilities in Paradise Valley to comply with the EPA's new arsenic containment standard for drinking water. That standard goes into effect on January 23, 2006. The current standard is 50 parts per billion ("ppb"). The new standard is 10 ppb. Arizona-American currently delivers water in Paradise Valley at levels below the present standard but in excess of the new standard. In order to prevent deterioration of Arizona-American's financial health, the Company must recover at least a portion of these significant costs on a timely basis.

Q. WHAT FACILITIES WILL ACTUALLY BE CONSTRUCTED?

A. Mr. Joseph Gross addresses the technical details of the facilities Arizona-American needs to construct to comply with the new federal standard.

Q. HOW DOES ARIZONA-AMERICAN'S PROPOSED ACRM FOR PARADISE VALLEY COMPARE TO THE ACRM REQUESTED BY ARIZONA-AMERICAN IN DOCKET NO. WS-01303A-02-0867, ET AL?

A. Arizona-American's request for Paradise Valley is almost identical to that requested in docket WS-01303A-02-0867, et al:

1. The ACRM is based solely on actual costs and costs eligible for recovery, which are depreciation, gross return, and recoverable O&M.

2. Actual rate recovery via the ACRM commences after new arsenic facilities are in service and are in compliance with the new US EPA standard for arsenic.

3. Establishment of deadlines for filing our next rate case, without limit on Arizona American's ability to file earlier as per existing Commission orders.

4. An ACRM rate design composed of a 50/50 split of the recovery between monthly minimum charges and volumetric charges. The volumetric charges will be based on the same inclining block rate design as will be approved in this decision.

5. A financial presentation composed of ten standard schedules.

6. Recoverable O&M costs include only media replacement or regeneration, media replacement or regeneration service, and waste disposal.

7. A deferral for future recovery of up to 12 months of recoverable O&M, without return, commencing with the in-service of facility(s).

8. Two step-rate increases.

9. No true-up of the ACRM for over or under collection.

10. Gross return included in the ACRM based on the return authorized in this proceeding.

Q. HOW WILL ARIZONA-AMERICAN FINANCE THE FACILITIES?

A. The Company will finance the facilities with debt and equity. Arizona-American considered borrowing from the Arizona Water Infrastructure Finance Authority ("WIFA"), but concluded that borrowing from WIFA offered no material benefit over borrowing from AWCC. Arizona-American is currently able to borrow from AWCC at a rate of 70 basis points above Treasury — a rate much better than Arizona-American, or likely any other Arizona water company, could borrow on its own. Further, it does not appear that Arizona American would meet the interest coverage test in WIFA's requirements.

Q. WHAT FINANCIAL SCHEDULES WILL THE COMPANY FILE IN CONNECTION WITH THE ACRM?

A. Arizona-American will file the same schedules proposed in Docket No. WS-01303A-02-0867, et al. These are also the same schedules approved for Arizona Water Company's Northern Division in Decision No. 66400.

Q. WHAT IS ARIZONA-AMERICAN'S ANTICIPATED TIMELINE FOR THE PARADISE VALLEY'S ACRM?

A. The ACRM timeline will depend on: 1) the timing the completion of the facilities, and 2) the timing of a final order in this proceeding. Assuming: 1) the completion of facilities by July 2006, and 2) a final order in this proceeding also issued in July 2006, we anticipate the following timeline:

1) An accounting order is issued in this proceeding before January 31, 2006, approving the deferral of capital costs (depreciation and gross return) related to arsenic treatment facilities completed and placed into service in Paradise Valley prior to the ACRM going into effect.

2) A final order is issued in July 2006, and then Arizona-American files the standard ACRM schedules with the Commission in August 2006, requesting a specific step 1 ACRM rate increase in Paradise Valley. Additionally, Step 1 may include arsenic treatment facility capital costs deferred prior to Step 1.

3) The parties review the filing at an Open Meeting in September 2006 and the Commission approves a specific ACRM surcharge for Paradise Valley, which is effective on customer bills in October 2006.

4) Arizona-American again compiles the standard ACRM schedules using actual data and files them at the Commission in August 2007, requesting a specific Step Two ACRM rate increase in Paradise Valley.

5) The parties review the filing and later at an Open Meeting in late September 2007 the Commission approves a Step Two specific ACRM surcharge for Paradise Valley, which is effective on customer bills in October 2007.

6) The ACRM surcharge will then remain on customer bills until the effective date of new permanent rates in Paradise Valley, at which time the ACRM will end.

Q. PLEASE FURTHER DESCRIBE THE REQUEST FOR AN ACCOUNTING ORDER.

A. Arizona-American is required to comply with the EPA standards for Arsenic levels in 2006. It is fully expected that the required Arsenic removal facilities will be on-line and useful well prior to the expected decision date July 2006 in this case. Since these facilities will be on-line and useful prior to the decision date, Arizona-American needs a mechanism in place to mitigate the negative income impacts of the revenue requirement for these facilities as they become useful. Since the proposal herein is to approve the ACRM after the decision date in this proceeding, it is necessary to receive an accounting order from the Commission to allow for the deferral of the return and depreciation on the completed facilities until the ACRM is in place. This accounting order needs to be issued before the end of January 2006 to ensure all revenue requirements of the facilities can be deferred.

Q. WHAT IS ARIZONA-AMERICAN'S PLANNED SCHEDULE FOR FILING THE NEXT PERMANENT RATE CASE FOR PARADISE VALLEY?

A. Arizona-American currently plans to file a rate case for its Paradise Valley District not later than May 2010. The selection of this date is driven by the schedule for the PS Surcharge discussed in the next section.

IV. <u>PUBLIC SAFETY SURCHARGE</u>

Q. WHAT IS ARIZONA-AMERICAN'S REQUEST IN THIS PART OF THE PROCEEDING?

A. Arizona-American is requesting approval of a PSS surcharge for Paradise Valley. Additionally, Arizona-American is requesting that the Commission issue an interim accounting order in this proceeding approving the deferral of capital costs (depreciation and gross return) related to public safety/fire flow improvement facilities placed into service in Paradise Valley prior to the surcharge going into effect. Once approved, Arizona American will make a series of filings for specific PS step-increases based on actual capital costs.

Q. WHY IS THE APPROVAL OF A SURCHARGE MECHANISM NEEDED IN ORDER FOR ARIZONA-AMERICAN TO COMPLETE PARADISE VALLEY FIRE FLOW IMPROVEMENT PROJECTS IN A TIMELY MANNER?

A. Since the fire flow improvements are really a series of many individual projects, the Company cannot afford to absorb the regulatory lag on such a discretionary undertaking.

In their testimonies, Mr. Gross and Mr. Biesemeyer discuss the identified need to improve the Paradise Valley fire flow network, the capital improvements needed to improve the network, the timing for completing those projects, and the Town of Paradise Valley's strong support for such an undertaking. In a good-faith belief that the Commission will authorize implementation of a surcharge mechanism, Arizona-American either has already completed, or will soon complete, the initial phase of the total project.

From a ratemaking perspective, surcharges provide an alternative to frequent base rate increase requests and mitigate earnings attrition that results when large construction projects are completed between base rate cases. Earnings attrition increases investment risk that, in turn leads to increased capital costs. A surcharge mechanism also facilitates timely and orderly construction planning and helps secure the capital commitments that are vital to any planning process.

Q. WHAT ARE SOME OF THE UNIQUE FINANCING AND RATEMAKING ISSUES ASSOCIATED WITH COMPLETING CAPITAL PROJECTS TO REPLACE PORTIONS OF A WATER DISTRIBUTION SYSTEM?

A. A water distribution network is not only needed to provide high quality and reliable water service to residents and businesses, it simultaneously provides water at pressures sufficient to meet fire flow demands. Rates must be set to balance the unique costs associated with the dual use of the distribution system between water use customers and fire protection service providers.

Distribution system assets typically have long lives and extremely low annual depreciation rates. For example, currently it takes Arizona-American about 50 years to recover the original cost of capital investments completed to replace portions of its distribution network. Therefore, depreciation accrual rates that reflect long property lives minimize internal cash flows and cause a greater portion of the rate base to be externally financed than would otherwise be required. Absent a surcharge mechanism for the recovery of a portion of any significant increase in depreciation expense, completion of large construction projects only compound this cash flow problem.

Additionally, construction projects completed to improve fire flows will not generate any additional annual revenues. The program will only enhance service to existing customers. As a result, absent a surcharge mechanism, no additional revenues will be available on a timely basis to offset cash flow erosion and earnings attrition.

Q. WHAT TYPES OF CAPITAL EXPENDITURES ARE PROPOSED FOR INCLUSION IN THE CALCULATION OF THE PUBLIC SAFETY SURCHARGE?

A. The Company proposes to include capital expenditures for projects that a) improve fire flows; b) produce no significant additional revenues and c) do not materially reduce operating expenses. Records will be maintained to segregate the cost of eligible capital investments and capital investments that would otherwise be made during the due course of the Paradise Valley on-going operation.

This narrow definition of an "eligible" investment is the primary feature of the PS surcharge that distinguishes it from surcharges authorized by regulators in other states for the recovery of additional costs associated with distribution system improvement projects. Those types of surcharges include a much broader spectrum of distribution system improvements as eligible investments.

Q. ARE THERE ANY OTHER FEATURES OF THE PROPOSED SURCHARGE THAT DIFFER FROM FEATURES OF DISTRIBUTION SYSTEM IMPROVEMENT SURCHARGES IN PLACE IN OTHER STATES?

A. Yes. Approved distribution system improvement surcharges in place in other states are typically adjusted on a quarterly basis. Arizona-American proposes only that the PS surcharge be annually adjusted.

Q. WHY DOESN'T ARIZONA-AMERICAN MINIMIZE EARNINGS ATTRITION BY USING OTHER RATEMAKING AND ACCOUNTING TECHNIQUES ALREADY IN PLACE?

A. The Paradise Valley fire-flow improvement program consists of several revenue-neutral projects. Individually, those projects will require several hundreds of thousands of dollars of capital expenditures each. However, collectively these projects will require capital expenditures in excess of $16 million.

Under current accounting and ratemaking precepts, completing such a program between base rate cases will result in earnings erosion and increase the need to file frequent base rate cases to minimize that impact. As noted earlier, earnings risk increases investment risk that in turn, increases the cost of capital for other externally-financed capital investments as well as the cost of financing the entire rate base. Therefore, absent a surcharge mechanism, there is no ratemaking or accounting technique other than frequent base rate case filings to offset earnings erosion.

Q. WHY DOESN'T ARIZONA-AMERICAN BOOK ALLOWANCE FOR FUNDS USED DURING CONSTRUCTION ("AFUDC") TO OFFSET A PORTION OF THE ANTICIPATED EARNINGS EROSION?

A. Arizona-American does book AFUDC for most large construction projects. However, projects such as water treatment or source of supply improvement projects typically take a long time to complete and have known completion dates. As a result, the timing of a base rate case filing that includes the final cost of those projects can be synchronized for optimum rate recognition between the in-service date of the project and the cessation of AFUDC accruals. AFUDC cannot be used to offset the earnings attrition caused by completion of the Paradise Valley fire flow improvement projects for two principal reasons.

First, several different construction projects will be completed throughout each year of the program. It would be impossible to synchronize rate recognition with the in-service dates of those projects. Consequently, even if Paradise Valley filed every year for rate relief, there would be a gap of a number of months following the completion of a revenue-neutral capital investment project during which neither a paper (i.e. AFUDC) nor a cash return could be earned.

Second, Arizona-American does not accrue AFUDC on projects that take less than one month to complete or that individually fail to meet a certain dollar threshold. Some of the planned construction projects will be completed within a few months. Therefore, even if AFUDC were booked on the fire flow improvement projects, only a minimal amount would be recorded.

Q. HOW DOES ARIZONA-AMERICAN PROPOSE TO INITIALLY IMPLEMENT THE PUBLIC SAFETY SURCHARGE?

A. Arizona-American is asking that Step One of the surcharge become effective on the same date that new base rates approved by the Commission in this docket become effective. We estimate that to be approximately mid-2006. The Step One surcharge would include the cost of fire-flow improvement projects completed by Arizona-American in 2005 and the beginning part of 2006, and include the gross return and depreciation deferred since the approval of the accounting order in this proceeding. We will provide detail related to fire-flow projects currently under design or construction, which will be completed and placed into service over the course of this proceeding to ensure that those projects are in service and benefiting customers on the date new rates are approved. Fire-flow related projects completed in 2004 are already included in the calculation of new base rates approved in this rate case.

Documents supporting the calculation of the initial surcharge will be filed no later than April 1, 2006. Based on current construction plans, the initial surcharge will then be increased in accordance with the following schedule:

	Filed	Implemented
Initial (Step 1) Surcharge	April 1, 2006	Mid-2006
Step 2 increase	Mid-2007	45-days
Step 3 increase	Mid-2008	45-days
Step 4 increase	Mid-2009	45-days
Step 5 increase	Mid-2010	45-days
Base Rate Increase	May-2010	June-2011

As Mr. Townsley discusses in his testimony, the Company proposes to file its next Paradise Valley rate case in 2010, or about four years following an anticipated final order in this case. The Company anticipates both the ACRM and PS surcharges to cease following a final order in the next Paradise Valley rate case, commensurate with placing these project costs in rate base.

Q. PLEASE FURTHER DESCRIBE ARIZONA-AMERICAN'S REQUEST FOR AN ACCOUNTING ORDER RELATED TO THE PS IMPROVEMENTS.

A. The proposed PS improvements are a discretionary expenditure in Paradise Valley. As such, Arizona-American can choose to make the investment or not, depending on many circumstances. Because there is widespread public demand for the investments, Arizona-American has decided to go forward with these facilities, subject to the approval of a reasonable cost recovery mechanism by this Commission. Part of this mechanism is to have in place an accounting order to allow the deferral of all investment costs (return and depreciation) related to portions of the project completed before the PSS is authorized. Part of the fire flow project is already complete and other portions will be complete in early 2006. The Company is not earning, or recovering depreciation, on these completed portions of the project. To mitigate this loss of return and depreciation, the Company requests that it be allowed an accounting order to defer the return and depreciation for later recovery in the first step of the PSS. It is further requested that this accounting order be issued as soon as reasonably possible after this application is filed.

Q. HOW WILL ARIZONA-AMERICAN CHANGE THE FILING AND IMPLEMENTATION DATES FOR THE PSS IF ACTUAL FIRE FLOW IMPROVEMENT CONSTRUCTION CANNOT BE COMPLETED AS CURRENTLY PLANNED?

A. It is anticipated that each construction phase can be completed during the year that phase is scheduled to begin. However, if some phase of the project cannot be completed during the same year that it begins, Arizona-American will alter its filing and implementation dates accordingly. However, Arizona-American will not make a filing for a PS step to become effective prior to twelve months after the effective date of the previous step.

Q. WILL THE PS SURCHARGE BE SEPARATELY IDENTIFIED ON CUSTOMER BILLS?

A. Yes, it will be separately shown as a line item on all customers' bills, except for public fire service customers. The surcharge will not be applied to bills for public fire service customers since most Paradise Valley general water service customers are also taxpayers of communities billed for public fire service. Therefore, passing the additional fixed costs to improve fire flows to public fire service customers in the form of the PS surcharge may result in the general water service customers of Paradise Valley experiencing either higher taxes or a reduction in public services. The allocation of public fire service costs among customer classes is best addressed during proceedings for the next base rate case.

Q. WILL THE PS SURCHARGE BE SUBJECT TO AUDIT?

A. Yes. Reports and reconciliations will be made regarding the proposed surcharge. Documents supporting the surcharge for any upcoming period will be filed with the Commission approximately 45 days prior to the implementation date. This step will ensure that eligible additions are in service prior to implementation of the surcharge. This step will also provide an opportunity for Commission review of the surcharge calculation prior to its inclusion on customer bills.

Additionally, an annual reconciliation of revenues collected under the surcharge will be performed. Records regarding revenues collected under the surcharge will be maintained for the reconciliation period and compared to actual revenues and costs for that period.

Q. HAVE YOU PREPARED AN EXAMPLE OF PUBLIC SAFETY SURCHARGE CALCULATIONS?

A. Yes. Attached to this testimony are schedules that calculate the surcharge anticipated to be implemented at the close of this proceeding and subsequent annual increases to that surcharge as additional eligible additions are placed in service during the following years. All surcharge forecasts are based on current construction cost estimates and timing, current annual depreciation rates and pro forma capital costs are used to calculate the revenue requirement requested in this rate case.

Schedule PSS-1 shows the Step-One surcharge calculation and Schedules PSS-2, 3, 4, and 5 show subsequent annual adjustments. As can be noted on these schedules, assuming the PS surcharge is authorized and implemented between 2005 and the end of 2009, Arizona American will spend over $16 million to improve fire flows. As a result of this significant rate base increase at the end of that period, a PS surcharge of about 39% will be in place.

The annual revenue requirement in terms of total dollars for the PS investments is projected to be as follows:

Step 1 (Including an estimate of the deferred amount)- $581,830
Step 2 - $1,114,539
Step 3 - $1,346,108
Step 4 - $1,674,083
Step 5 - $2,124,487

As the calculations on the attached exhibits clearly demonstrate, these important service enhancements can be timely completed, with a gradual adjustment of customer bills, if the PS Surcharge is approved.

Q. PLEASE DESCRIBE THE CALCULATIONS PRESENTED ON THE ATTACHED EXHIBITS IN GREATER DETAIL.

A. The first step of calculating the PS surcharge is shown on Schedule PSS-1. That step identifies eligible net additions. Some of the fire-flow improvement projects will require the replacement of existing facilities and associated retirements will result. A forecast of retirement costs has been included in the rate base calculation. Again, the actual PS surcharge will be based solely on actual, verifiable, plant additions and associated retirements.

The calculation of additional annual depreciation expense resulting from completion of the fire flow improvement projects is shown in the second step on Schedule PSS-1. Eligible depreciation expense is calculated by applying the current annual depreciation accrual rates to the original cost of the eligible property, net of retirements.

The increase in annual pre-tax return requirements is calculated in the third step on Schedule PSS-1. The actual surcharge calculation will be based on state and federal income tax rates and authorized returns approved in the final order for this general rate case. However, since that information will not be available until the Commission issues its final order, pro-forma costs were used on the attached schedules.

Finally, all cost elements of the surcharge are combined in the last step shown on Schedule PSS-1 to arrive at the necessary revenue requirement. This step also includes the deferred revenue requirement associated with the requested accounting order. Almost one-half of the first year's revenue requirement is related to the deferral. The calculation steps shown on Schedule PSS-1 are repeated in Schedules PSS-2, 3, 4, and 5.

Q. WHAT DO YOU PROPOSE AS A METHOD OF RECOVERY FOR THE NECESSARY REVENUE REQUIREMENT RELATED TO THE PS INVESTMENTS?

A. The Company proposes that the revenue requirement associated with the PS Investments be recovered 50 percent as a fixed monthly charge based on meter size, and the remaining 50 percent be recovered as a quantity rate surcharge. The proposed quantity rate surcharge would be an inclining two-block surcharge for residential customers and a flat block rate for all other customers. The break point for the residential customers would be at 80 units per month. Pages 2 and 3 of Schedule PSS-1 show the proposed rate design and resulting typical bill analysis based on the assumptions made on Schedule PSS-1, page 1.

Q. WHY HAVE YOU PROPOSED A TWO-BLOCK SURCHARGE FOR RESIDENTIAL CUSTOMERS AND A FLAT-BLOCK SURCHARGE FOR OTHER CUSTOMERS?

A. We have made this proposal for three reasons: 1) to promote conservation in the residential classification, 2) to provide some rate relief for smaller lower income customers, and 3) to provide an equitable, even recovery mechanism for the small number of non-residential customers in Paradise Valley. The flat block for non-residential is the most equitable since the increased fire protection benefits all equally. We did not propose the same for residential customers since we do not want to overly impact low-use, low-income, customers disproportionately to their income.

Q. PLEASE SUMMARIZE THE BENEFITS OF IMPLEMENTING THE SURCHARGE.

A. As discussed by other witnesses, there are numerous reasons why approval of the PS surcharge advances the public interest. However, the major ratemaking benefits are:

- **Shared Attrition Risk -** Approval of a surcharge mechanism will provide Arizona-American with the assurance needed to move forward with completion of engineering work, securing rights of way, permitting and other preparation work needed for the timely completion of the planned construction projects. That assurance is also a vital part of securing the capital needed for completion of the fire flow improvement program.

- **Potential Decrease in the Frequency of Rate Filings -**As this Commission is well aware, water utilities are the most capital intensive of all utility service providers. Completion of capital investment projects is one of the major factors that drive the need for water utilities to seek increases in base rates. Approval of a mechanism for the timely cost recovery for such a major capital investment undertaking will enable Arizona-American to postpone rate cases and their associated costs to all parties.

- **Long-Term Viability of Paradise Valley Fire Flows -** Paradise Valley customers want fire flow improvements. Arizona-American wants to meet the demands of its customers and improve existing fire flows in an orderly and timely manner. Approval of the PS Surcharge will facilitate achievement of this service enhancement. If this problem must be addressed over a longer period of time, it will become more difficult and costly to finance the work that needs to be done now. In addition, the cost of future improvements needed as the distribution system continues to age, will simply keep increasing.

V. HIGH-BLOCK USAGE SURCHARGES

Q. WHAT IS ARIZONA-AMERICAN'S PROPOSAL IN REGARDS TO HIGH-BLOCK SURCHARGES?

A. Arizona-American proposes to apply two separate non-cost of service-based surcharges on all units of water consumed by customers in the final block of the approved tariff. The two surcharges would be $2.00 per unit of water consumed, up to the last five percent of the total consumption in the high block, and $5.00 per unit of water consumed in the last five percent of the high block.

Q. WHY IS ARIZONA-AMERICAN PROPOSING SUCH A TARIFF SURCHARGE?

A. Arizona-American is proposing such surcharges to promote conservation and to relieve some of the cost of service on customers, including lower income customers in future proceedings.

Q. HOW WOULD SUCH A SURCHARGE RELIEVE PART OF THE COST OF SERVICE ON LOWER INCOME CUSTOMERS?

A. Arizona-American proposes that this surcharge be accounted for as a contribution in aid of construction. The funds collected through the surcharge would be recognized as a contribution toward plant, thereby reducing rate base. The reduction in rate base would lower the future revenue requirement, thereby reducing rates and assisting customers, including low-income customers.

The Company has not estimated the contribution from these two high block charges in its ACRM and PS surcharge calculations in this case. However, the actual on-going contributions will be reflected in future PS or ACRM Step filings.

Q. IS THERE PRECEDENT FOR SUCH A SURCHARGE?

A. The proposal is very similar in effect to existing low-income program, but with the additional benefit of also promoting conservation. Water use in Paradise Valley is historically high. Introducing rate incentives to conserve should promote conservation.

VI. PROPERTY SALES

Q. HAS ARIZONA-AMERICAN SOLD ANY UTILITY PROPERTY IN PARADISE VALLEY SINCE THE TIME OF ITS LAST RATE CASE IN 1998?

A. Yes, Arizona American sold one piece of utility property in 2004. The Company sold the former operations/customer center on Casa Blanca. The property was no longer used and useful, as operations have been moved to other locations, including an office located on McDonald Drive.

Q. WHAT WAS THE SALES PRICE AND NET GAIN ON THE LAND?

A. Below is the detail of the land sale:

1.	Sales Price	$900,000.00
2.	Sellers Costs	56,337.50
3.	Original Cost of Land	13,491.59
4.	Points	45,674.43
5.	TOTAL COSTS	$115,503.52
6.	Pre-Tax Gain	$784,496.48
7.	Taxes @ 38.60%	$302,185.64
8.	NET AFTER TAX GAIN	$481,680.84

Q. DOES ARIZONA-AMERICAN PROPOSE TO SHARE THE NET GAIN ON THE SALE OF THE LAND WITH RATEPAYERS?

A. Yes, consistent with Commission practice, Arizona-American proposes that the net gain on sale be shared 50-50 with ratepayers since this land was in rate base at the time of Paradise Valley's last rate case decision. Further, Arizona American proposes that the ratepayers' portion of the net gain of $240,840.42 be provided to ratepayers as a monthly fixed cost surcredit based on meter size, and the surcredit be spread over 5 years. This proposal would produce a surcredit of $0.54 per 5/8 inch meter per month for five years. All of the proposed monthly surcredits are as follows:

5/8 - inch	$0.54
3/4 - inch	$0.54
1 - inch	$0.92
1.5 - inch	$1.78
2 - inch	$2.81
3 - inch	$5.40
4 - inch	$8.96
6 - inch	$17.82

Q. WHY IS THE COMPANY PROPOSING TO REFUND THE CUSTOMER NET GAIN PORTION OVER 5 YEARS.

A. The land was in rate base over an extended period of time at a very small value, approximately $14,000. Earnings on the land were probably close to $2,000 annually. Because the annual cost to ratepayers was so negligible, spreading the extraordinary gain back to ratepayers over time was the most equitable method.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Arizona American Water Company
Paradise Valley District
Authorized vs. Earned Returns 1991 - 2001
(In Thousands)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
AZ-American operating income	$ 165	$ 27	$ 181	$ 292	$ 283	$ 295	$ 671	$ 694	$ 1,047	$ 1,331	$ 1,395	
AZ-American net rate base	1,783	1,901	3,886	4,119	4,911	8,690	9,451	10,024	12,319	12,213	11,835	
Earned ROR	9.2%	1.4%	4.7%	7.1%	5.8%	3.4%	7.1%	6.9%	8.5%	10.9%	11.8%	
Authorized ROR	11.9%	10.4%	9.7%	9.8%	9.4%	9.1%	9.6%	10.0%	9.7%	9.3%	9.3%	
Earnings at authorized ROR	212	198	377	406	462	791	909	1,001	1,190	1,140	1,105	
Annual over / (under) earnings	$ (47)	$ (170)	$ (195)	$ (113)	$ (180)	$ (496)	$ (238)	$ (307)	$ (143)	$ 191	$ 291	$ (1,410)
AZ-American net income	155	15	10	205	111	221	660	567	619	557	(50)	
Average common equity	1,931	1,918	1,891	1,924	1,963	5,489	9,180	7,630	6,032	6,151	6,047	
Earned ROE	8.0%	0.8%	0.5%	10.7%	5.7%	4.0%	7.2%	7.4%	10.3%	9.1%	-0.8%	
Authorized ROE	18.2%	12.7%	10.3%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	
Earnings at authorized ROE	351	244	194	212	216	604	1,010	839	664	677	665	
Annual over / (under) earnings	(196)	(229)	(184)	(6)	(105)	(383)	(350)	(272)	(44)	(120)	(715)	(2,605)

ARIZONA AMERICAN WATER
PARADISE VALLEY OPERATING DISTRICT
PUBLIC SAFETY SURCHARGE (PSS)

EFFECTIVE DATE XX/1/2006

2005/2006 ELIGIBLE NET ADDITIONS - STEP 1

	PROJECT NUMBER	DESCRIPTION	ADDITIONS	RETIREMENTS	NET ADDITIONS
	2005/2006 Projects				
1.		Jackrabbit/Invergordon 12" Main	$1,818,226	$9,091	$1,809,135
2.	8	16" WM McDonald & 44th Street	667,000	3,335	663,665
3.		Fire Hydrants	200,000	1,000	199,000
4.		Contingency (on progect 8 only)	66,700	334	63,365
			2,751,926	13,760	2,735,165

DEPRECIATION

	PROJECT NUMBER	DESCRIPTION	ANNUAL DEPRECIATION RATE	ADDITIONS	ANNUAL DEPRECIATION
	Depreciation on 2005/2006 Additions				
5.		Main Replacements	2.52%	2,536,165	63,911
6.		Fire Hydrants	2.10%	199,000	4,179
7.		Totals		$2,735,165	$68,090

REVENUE REQUIREMENT RATE

	Capital	Amount (000's)	Percent	Capital Cost	Weighted Cost Rate	Revenue Multiplier	Revenue Requirement Factor
8.	Debt	$198,791,428	63.27%	5.40%	3.42%	1.0000	3.42%
9.	Equity	115,410,356	36.73%	12.00%	4.41%	1.6300	7.18%
10.	Total	$314,201,784	100.00%		7.82%		10.60%

2006 (STEP 1) SURCHARGE CALCULATION

11.	2005/2006 (Step 1) - Eligible Net Additions	$2,735,165
12.	Net Rate Base for 2006 (Step 1) PSS Calculation	$2,735,165
13.	Revenue Requirement Rate	10.60%
14.	Pre-Tax Return on Net Rate Base	$289,959
15.	Annual Depreciation Expense on Eligible Investments	68,090
16.	Deferral of Gross Return on 75% of projects (assumes 9-05 acct. order and 7-06 final order)	181,224
17.	Deferral of Depreciation on 75% of projects (assumes 9-05 acct. order and 7-06 final order)	42,556
18.	Total PSS Costs	$581,830
19.	Minimum Revenue	$290,915
20.	Commodity Revenue	$290,915
21.	Base Rate Revenue to Be Collected From during Step 1	$5,400,000
22.	PSS As Percentage of Bills Rendered During Step 1	10.77%
23.	Impact on a $65 Monthly Bill	$7.00

ARIZONA AMERICAN WATER
PARADISE VALLEY OPERATING DISTRICT
PUBLIC SAFETY SURCHARGE (PSS)

SCHEDULE PSS-1

EFFECTIVE DATE XX/1/2006

MONTHLY MINIMUM SURCHARGE CALCULATION - STEP 1

	Meter Size	Monthly Minimum	Minimum Multiples	2004 Avg. Customers	Equivalent Meters	Fixed Increment Monthly	Fixed Increment Annual Total
1.	5/8 - inch	$ 8.41	1.0	2390	2,390	3.28	$ 94,031
2.	3/4 - inch	$ 8.74	1.0	17	18	3.41	$ 695
3.	1 - inch	$ 14.01	1.7	1957	3,260	5.46	$ 128,264
4.	1.5 - inch	$ 28.02	3.3	-	-	10.92	$ -
5.	2 - inch	$ 44.83	5.3	267	1,423	17.48	$ 55,996
6.	3 - inch	$ 84.06	10.0	12	120	32.77	$ 4,719
7.	4 - inch	$ 140.10	16.7	1	17	54.62	$ 655
8.	6 - inch	$ 280.20	33.3	5	167	109.24	$ 6,554
9.	Total			4,649	7,394.23		
10.	Times 12 Months				88,730.77		
11.	Minimum Surcharge					$ 3.28	$ 290,915

COMMODITY SURCHARGE CALCULATION - STEP 1

	Avg. Consumption	(000 Gallons)	Customers
12.	Total Company	3,213,392	4,649
13.	Residential	2,281,374	4,342
14.	Non Residential	932,018	307
15.	Non Residential Commodity Surcharge (per 1,000 Gal)	$ 0.0792	

	Residential	**Per Customer (000 Gal.)**	**Block 1 0 - 25**	**Block 2 26 - 80**	**Block 3 > 80**
16.	Avg. Monthly Consumption	43.8	18.4	15.5	9.9

		Block 1 0 - 80	**Block 2 > 80**
17.	Residential Surcharge (per 1,000 Gal.)	$0.0792	$0.1500

		Monthly	Annual Total
18.	Residential - Block 1	$ 11,650	$ 139,798
19.	Residential - Block 2	$ 6,445	$ 77,337
20.	Non Residential	$ 6,148	$ 73,780
21.	Total	$ 6,148	$ 290,915
22.	Total Monthly Minimum & Commodity Revenue - STEP 1		$ 581,830

ARIZONA AMERICAN WATER
PARADISE VALLEY OPERATING DISTRICT
PUBLIC SAFETY SURCHARGE (PSS)

SCHEDULE PSS-1
PAGE 3 OF 3
EFFECTIVE DATE XX/1/2006

PSS TYPICAL 5/8 INCH RESIDENTIAL BILL ANALYSIS - STEP 1

	Gallons Consumption	Present Rates	Proposed Rates	Percent Increase
1.	-			
2.	1,000	$ 9.14	$ 12.50	36.7%
6.	5,000	$ 12.06	$ 15.73	30.5%
11.	10,000	$ 15.71	$ 19.78	25.9%
16.	15,000	$ 19.36	$ 23.83	23.1%
17.	20,000	$ 23.01	$ 27.87	21.1%
18.	25,000	$ 26.66	$ 31.92	19.7%
19.	30,000	$ 35.06	$ 40.71	16.1%
20.	35,000	$ 43.46	$ 49.51	13.9%
21.	40,000	$ 51.86	$ 58.31	12.4%
22.	45,000	$ 60.26	$ 67.10	11.4%
23.	50,000	$ 68.66	$ 75.90	10.5%
24.	55,000	$ 77.06	$ 84.69	9.9%
25.	60,000	$ 85.46	$ 93.49	9.4%
26.	65,000	$ 93.86	$ 102.28	9.0%
27.	70,000	$ 102.26	$ 111.08	8.6%
28.	75,000	$ 110.66	$ 119.88	8.3%
29.	80,000	$ 119.06	$ 128.67	8.1%
30.	85,000	$ 129.91	$ 140.27	8.0%
31.	90,000	$ 140.76	$ 151.87	7.9%
32.	95,000	$ 151.61	$ 163.47	7.8%
33.	100,000	$ 162.46	$ 175.07	7.8%
34.	105,000	$ 173.31	$ 186.67	7.7%
35.	110,000	$ 184.16	$ 198.27	7.7%
36.	115,000	$ 195.01	$ 209.87	7.6%
37.	120,000	$ 205.86	$ 221.47	7.6%
38.	125,000	$ 216.71	$ 233.07	7.5%
39.	130,000	$ 227.56	$ 244.67	7.5%
40.	135,000	$ 238.41	$ 256.27	7.5%

		Present Rates	Proposed Rates	Percent Increase
41.	Avg. Consumption (000 Gal.)	43.8	43.8	
42.	Average Residential Bill	$ 58.24	$ 64.99	11.6%
43.	Minimum Rate	$ 8.41	$ 11.69	39.0%
44.	Block 1 (0 - 25) Commodity	0.73	0.81	10.8%
45.	Block 2 (26 - 80) Commodity	1.68	1.76	4.7%
46.	Block 3 (> 80) Commodity	2.17	2.32	6.9%

ARIZONA AMERICAN WATER
PARADISE VALLEY OPERATING DISTRICT
PUBLIC SAFETY SURCHARGE (PSS)

SCHEDULE PSS-2
EFFECTIVE DATE XX/1/2007

2006/2007 ELIGIBLE NET ADDITIONS - STEP 2

	PROJECT NUMBER	DESCRIPTION	ADDITIONS	RETIREMENTS	NET ADDITIONS
	2006/2007 Projects				
1.	1	16" WM Lincoln/New CCBPS	$1,255,570	$6,278	$1,249,292
2.	3	16" WM Tatum	905,510	4,528	900,982
3.	3	Fire Hydrants - Tatum	30,000	150	29,850
4.	9	8" WM - Tatum	113,850	569	113,281
5.	2	BPS CWH/8' WM Highland Drive	382,375	1,912	380,463
6.	4	8'WM - S.CC zone	301,731	1,509	300,222
7.	4	Fire Hydrants - S.CC zone	25,000	125	24,875
8.	5	Replace 4" WM/CWSHPS	613,813	3,069	610,744
9.	5	Fire Hydrants - CWSHPS	25,000	125	24,875
10.	*6*	*Stone Cayon/Racquet Club*	577,875	2,889	574,986
11.	10	8" WM - N. CC zone	306,763	1,534	305,229
12.	1A	1.5MG Reservoir	750,000	3,750	746,250
13.		Contingency	528,749	2,644	526,105
			5,816,236	29,081	5,787,155

DEPRECIATION

	PROJECT NUMBER	DESCRIPTION	ANNUAL DEPRECIATION RATE	ADDITIONS	ANNUAL DEPRECIATION
	Depreciation on 2006/2007 Additions				
14.		Main Replacements	2.52%	$4,961,305	125,025
15.		Hydrant Replacements	2.10%	79,600	1,672
16.		Reservoirs	3.15%	746,250	23,507
17.		Totals		$5,787,155	$150,203

REVENUE REQUIREMENT RATE

	Capital	Amount (000's)	Percent	Capital Cost	Weighted Cost Rate	Revenue Multiplier	Revenue Requirement Factor
18.	Debt	$198,791,428	63.27%	5.40%	3.42%	1.0000	3.42%
19.	Equity	115,410,356	36.73%	12.00%	4.41%	1.6300	7.18%
20.	Total	$314,201,784	100.00%		7.82%		10.60%

2007 (STEP 2) SURCHARGE CALCULATION

21.	2005/2006 (Step 1) - Eligible Net Additions	$2,735,165
22.	2006/2007 (Step 2) - Eligible Net Additions	$5,787,155
23.	Less: Accumulated Depreciation On 2005/2006 Additions - One Year	68,090
24.	Net Rate Base for 2007 (Step 2) PSS Calculation	$8,454,229
25.	Revenue Requirement Rate	10.60%
26.	Pre-Tax Return on Net Rate Base	$896,246
27.	Annual Depreciation Expense on Eligible Investments	218,294
28.	*Total PSS Costs*	$1,114,539
29.	Minimum Revenue	$557,270
30.	Commodity Revenue	$557,270
31.	Base Rate Revenue to Be Collected During Step 2	$5,400,000
32.	PSS As Percentage of Bills Rendered During Step 2	20.64%
33.	Impact on a $65 Monthly Bill	$13.42
34.	Less: Surcharge Already Included on the Monthly Bill	7.00
35.	Incremental Increase in Monthly Surcharge	$6.41

ARIZONA AMERICAN WATER
PARADISE VALLEY OPERATING DISTRICT
PUBLIC SAFETY SURCHARGE (PSS)

SCHEDULE PSS-3
EFFECTIVE DATE XX/1/2008

2007/2008 ELIGIBLE NET ADDITIONS - STEP 3

	PROJECT NUMBER	DESCRIPTION	ADDITIONS	RETIREMENTS	NET ADDITIONS
	2007/2008 Projects				
1.	7	8" WM Clearwater Parkway	$56,925	$285	$56,640
2.	8	16" WM McDonald & 44th Street	511,520	2,558	508,962
3.	8	Fire Hydrants McDonald & 44th St	200,000	1,000	199,000
4.	10	12" WM N. CC zone	181,125	906	180,219
5.	10	Fire Hydrants N. CC zone	25,000	125	24,875
6.	11	Las Brisas Fire Pump and 8" WM	392,438	1,962	392,438
7.	11	Fire Hydrants - Las Brisas	25,000	125	24,875
8.	12A	12" and 8" WM serving Tatum Canyon	387,090	1,935	385,155
9.		Contingency	177,910	890	177,020
10.		Totals	$1,957,008	$9,785	$1,949,185

DEPRECIATION

	PROJECT NUMBER	DESCRIPTION	ANNUAL DEPRECIATION RATE	ADDITIONS	ANNUAL DEPRECIATION
11.		Main Replacements	2.52%	$1,700,435	42,851
12.		Hydrant Replacements	2.10%	248,750	5,224
13.		Totals		$1,949,185	$48,075

REVENUE REQUIREMENT RATE

	Capital	Amount (000's)	Percent	Capital Cost	*Weighted Cost Rate*	*Revenue Multiplier*	Revenue *Requirement* Factor
14.	Debt	$198,791,428	63.27%	5.40%	3.42%	1.0000	3.42%
15.	Equity	115,410,356	36.73%	12.00%	4.41%	1.6300	7.18%
16.	Total	$314,201,784	100.00%		7.82%		10.60%

2008 (STEP 3) SURCHARGE CALCULATION

17.	2005/2006 (Step 1) - Eligible Net Additions	$2,735,165
18.	2006/2007 (Step 2) - Eligible Net Additions	5,787,155
19.	2007/2008 - (Step 3) Eligible Net Additions	1,949,185
20.	Less: Accumulated Depreciation On 2005/2006 (Step 1) Additions (2 years)	136,181
21.	*Accumulated Depreciation on 2006/2007 (Step 2) Additions (1 Year)*	150,203
22.	Net Rate Base for 2008 (Step 3) PSS Calculation	$10,185,120
23.	Revenue Requirement Rate	10.60%
24.	Pre-Tax Return on Net Rate Bases	$1,079,740
25.	Annual Depreciation Expense on Eligible Investments	266,368
26.	Total PSS Costs	$1,346,108
27.	Minimum Revenue	$673,054
28.	Commodity Revenue	$673,054
29.	Base Rate Revenue to Be Collected during Step 3	$5,400,000
30.	PSS As *Percentage of Bills Rendered During* Step 3	24.93%
31.	Impact on a $65 Monthly *Bill*	$16.20
32.	Less: Surcharge Already Included on the Monthly Bill	13.42
33.	Incremental Increase in Monthly Surcharge	$2.79

ARIZONA AMERICAN WATER | **SCHEDULE** | **PSS-4**
PARADISE VALLEY OPERATING DISTRICT | **EFFECTIVE DATE** | **XX/1/2009**
PUBLIC SAFETY SURCHARGE (PSS)

2008/2009 ELIGIBLE NET ADDITIONS - STEP 4

	PROJECT NUMBER	DESCRIPTION	ADDITIONS	RETIREMENTS	NET ADDITIONS
	2008/2009 Projects				
1.		Reevaluation	$100,000	$500	$99,500
2.		4" Main Replacements	1,536,975	7,685	1,529,290
3.		Replace 50 Fire Hydrants	250,000	1,250	248,750
4.	16	8" Water Main - Zone North	480,700	2,404	478,297
5.		Valve Study	120,000	600	119,400
6.		Contingency	248,768	1,244	247,524
7.		Totals	$2,736,443	$13,682	$2,722,760

DEPRECIATION

	PROJECT NUMBER	DESCRIPTION	ANNUAL DEPRECIATION RATE	ADDITIONS	ANNUAL DEPRECIATION
8.		Main Replacements	2.52%	$2,474,010	62,345
9.		Hydrant Replacements	2.10%	248,750	5,224
10.		Totals		$2,722,760	$67,569

REVENUE REQUIREMENT RATE

	Capital	Amount (000's)	Percent	Capital Cost	*Weighted* Cost Rate	*Revenue* Multiplier	Revenue *Requirement* Factor
11.	Debt	$198,791,428	63.27%	5.40%	3.42%	1.0000	3.42%
12.	Equity	115,410,356	36.73%	12.00%	4.41%	1.6300	7.18%
13.	Total	$314,201,784	100.00%		7.82%		10.60%

2009 (STEP 4) SURCHARGE CALCULATION

14.	2005/2006 (step 1) - Eligible Net Additions	$2,735,165
15.	2006/2007 (Step 2) - Eligible Net Additions	$5,787,155
16.	2007/2008 (Step 3) - Eligible Net Additions	1,949,185
17.	2008/2009 (Step 4) - Eligible Net Additions	2,722,760
18.	Less: Accumulated Depreciation On 2005/2006 (Step 1) Additions (3 years)	204,271
19.	Accumulated Depreciation on 2006/2007 (Step 2) Additions (2 years)	300,407
20.	Accumulated Depreciation on 2007/2008 (Step 3) Additions (1 year)	48,075
21.	Net Rate Base for 2009 (Step 4) PSS Calculation	$12,641,512
22.	Revenue Requirement Rate	10.60%
23.	Pre-Tax Return on Net Rate Bases	$1,340,146
24.	Annual Depreciation Expense on Eligible Investments	333,937
25.	Total PSS Costs	$1,674,083
26.	Minimum Revenue	$837,041
27.	Commodity Revenue	$837,041
28.	Base Rate Revenue to Be Collected during Step 4	$5,400,000
29.	PSS As Percentage of Bills Rendered During Step 4	31.00%
30.	Impact on a $65 Monthly Bill	$20.15
31.	Less: Surcharge Already Included on the Monthly Bill	16.20
32.	Incremental Increase in Monthly Surcharge	$3.95

ARIZONA AMERICAN WATER | SCHEDULE PSS-5
PARADISE VALLEY OPERATING DISTRICT | EFFECTIVE DATE XX/1/2010
PUBLIC SAFETY SURCHARGE (PSS)

2009/2010 ELIGIBLE NET ADDITIONS - STEP 5

	PROJECT NUMBER	DESCRIPTION	ADDITIONS	RETIREMENTS	NET ADDITIONS
	2009/2010 Projects				
1.	13	8"/6" cactus Wren/Sierra Vista	$359,318	$1,797	$357,521
2.	14	8" WM Invergordon	538,085	2,690	535,395
3.	15	8"WM Chaparral	414,000	2,070	411,930
4.	15	Fire Hydrants - Chaparral	70,000	350	69,650
5.	17B	8"/6" Keim/Bethany Home area	208,840	1,044	207,796
6.	17B	Fire Hydrants Keim/Bethany Home	10,000	50	9,950
7.	18	Club Estates/Glen Drive Fire Pump	614,790	3,074	611,716
8.	19	Stone Canyon 4" WM Replacements	395,456	1,977	393,479
9.	19	Fire Hydrants - Stone Canyon	40,000	200	39,800
10.		4" Main Replacements	638,699	3,193	635,506
11.		Fire Hydrants	100,000	500	99,500
12.		Contingency	338,919	1,695	337,224
13.		Totals	$3,728,107	$18,641	$3,709,466

DEPRECIATION

	PROJECT NUMBER	DESCRIPTION	ANNUAL DEPRECIATION RATE	ADDITIONS	ANNUAL DEPRECIATION
14.		Main Replacements	2.52%	$3,490,566	87,962
15.		Hydrant Replacements	2.10%	218,900	4,597
16.		Totals		$3,709,466	$92,559

REVENUE REQUIREMENT RATE

	Capital	Amount (000's)	Percent	Capital Cost	Weighted Cost Rate	Revenue Multiplier	Revenue Requirement Factor
17.	Debt	$198,791,428	63.27%	5.40%	3.42%	1.0000	3.42%
19.	Equity	115,410,356	36.73%	12.00%	4.41%	1.6300	7.18%
20.	Total	$314,201,784	100.00%		7.82%		10.60%

2010(STEP 5) SURCHARGE CALCULATION

21.	2005/2006 (Step 1) - Eligible Net Additions	$2,735,165
22.	2006/2007 (Step 2) - Eligible Net Additions	$5,787,155
23.	2007/2008 (Step 3) - Eligible Net Additions	1,949,185
24.	2008/2009 (Step 4) - Eligible Net Additions	2,722,760
25.	2009/2010 (Step 5) - Eligible Net Additions	3,709,466
26.	Less: Accumulated Depreciation On 2005/2006 (Step 1) Additions (4 years)	272,361
27.	Accumulated Depreciation on 2006/2007 (Step 2) Additions (3 years)	450,610
28.	Accumulated Depreciation on 2007/2008 (Step 3) Additions (2 years)	96,149
29.	Accumulated Depreciation on 2008/2009 (Step 4) Additions (1 year)	67,569
30.	Net Rate Base for 2010 (Step 5) PSS Calculation	$16,017,041
31.	Revenue Requirement Rate	10.60%
32.	Pre-Tax Return on Net Rate Bases	$1,697,991
33.	Annual Depreciation Expense on Eligible Investments	426,496
34.	Total PSS Costs	$2,124,487
35.	Minimum Revenue	$1,062,243
36.	Commodity Revenue	$1,062,243
37.	Base Rate Revenue to Be Collected During Step 5	$5,400,000
38.	PSS As Percentage of Bills Rendered During Step 5	39.34%
39.	Impact on a $65 Monthly Bill	$25.57
40.	Less: Surcharge Already Included on the Monthly Bill	20.15
41.	Incremental Increase in Monthly Surcharge	$5.42

KOLBE

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT.	DOCKET NO. W-01303A-05-

DIRECT TESTIMONY
OF
A. LAWRENCE KOLBE
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

TABLE OF CONTENTS

I. INTRODUCTION AND SUMMARY

Q1. Please state your name and address for the record.

A1. My name is A. Lawrence Kolbe. My business address is The Brattle Group, 44 Brattle Street, Cambridge, Massachusetts, 02138.

Q2. Please describe your job and your educational experience.

A2. I am a Principal of The Brattle Group, an economic, environmental and management consulting firm with offices in Cambridge, Washington, London and San Francisco. My work concentrates on financial and regulatory economics. I hold a B.S. from the U.S. Air Force Academy and a Ph.D. from the Massachusetts Institute of Technology, both in economics.

Q3. What is the purpose of your testimony in this proceeding?

A3. I have been asked by Arizona-American Water Company ("Arizona-American" or the "Company") to present economic principles that govern selection of an appropriate rate of return on equity for a privately owned, rate-regulated company. I have also been asked to estimate the cost of equity capital for Arizona-American's Paradise Valley Water Company ("Paradise Valley") at its current 36.7 percent equity ratio. For the latter task, I draw in part on the findings in the companion testimony of my Brattle colleague, Dr. Michael J. Vilbert ("Vilbert Testimony").

Q4. Please summarize any parts of your background and experience that are particularly relevant to your testimony on these matters.

A4. I have been a student of rate regulation for more than 25 years. Among other publications, I am a co-author of two books[1] and dozens of papers and articles that focus on various aspects of rate regulation, as well as a third book that addresses capital investment and valuation generally.[2] One of my papers appears in a law journal and addresses the economics of the U.S. Supreme Court's risk-return standards for rate-regulated companies,[3] and other papers in various economics journals address aspects of the same set of issues.[4]

I have testified on financial and regulatory issues in many forums. These include international arbitrations in The Hague, London and Melbourne, Australia; lawsuits in U.S. courts; U.S. arbitrations, and U.S. and Canadian regulatory proceedings. In particular, I have provided expert testimony in regulatory proceedings before seven U.S. and Canadian federal regulatory bodies and one or more regulatory bodies in 17 states or provinces. These proceedings have concerned a variety of rate-regulated companies or industries, including integrated electric utilities, electric power transmission, electric power distribution, electric power generation, gas transmission, gas distribution, oil pipelines, a privately owned toll road, local telephone service, long-distance telephone service, cable television service, automobile insurance, workers

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[1] A. Lawrence Kolbe and James A. Read, Jr., with George R. Hall, *The Cost of Capital: Estimating the Rate of Return for Public Utilities*, Cambridge, MA: The MIT Press (1984), and A. Lawrence Kolbe, William B. Tye and Stewart C. Myers, *Regulatory Risk: Economic Principles and Applications to Natural Gas Pipelines and Other Industries*, Boston: Kluwer Academic Publishers (1993).

[2] Richard A. Brealey and Stewart C. Myers, with The Brattle Group, *Capital Investment and Valuation* (Brattle author A. Lawrence Kolbe), New York: McGraw-Hill/Irwin (2003).

[3] A. Lawrence Kolbe and William B. Tye, "The *Duquesne* Opinion: How Much '*Hope*' Is There for Investors in Regulated Firms?" *Yale Journal on Regulation* 8:113-157 (1991).

[4] A. Lawrence Kolbe and William B. Tye, "The Fair Allowed Rate of Return with Regulatory Risk," *Research in Law and Economics* 15:129-169 (1992); A. Lawrence Kolbe and William B. Tye, "Compensation for the Risk of Stranded Costs," *Energy Policy* 24:1025-1050 (1996); and A. Lawrence Kolbe and Lynda S. Borucki, "The Impact of Stranded-Cost Risk on Required Rates of Return for Electric Utilities: Theory and An Example" (with Lynda S. Borucki). *Journal of Regulatory Economics* 13:255-275 (1998).

compensation insurance, postal service, ocean shipping, and water. I have also testified in an international arbitration in The Hague on regulatory issues that arose under a treaty dispute between the U.K. and the U.S. concerning landing charges at London's Heathrow Airport, and I am a co-author of reports filed with Australian regulatory bodies. I have worked on matters involving rate regulation of trucking and of railroads, but I have not testified in proceedings involving these industries. Additionally, I have applied some of the economic principles that underlie rate regulation in royalty arbitrations concerning coal, oil and gas in the U.S. and Australia. Appendix A contains more information on my professional qualifications.

I have not previously testified before the Arizona Corporation Commission ("Commission").

Q5. Please summarize your testimony's main points:

A5. My testimony covers five topics: the nature of the investment process, investors' interpretation of the allowed rate of return, the market-to-book ratio test, the effect of debt on the cost of equity, and the cost of equity for Paradise Valley. The main points in each of these five areas, numbered accordingly, are:

1. Nature of the Investment Process

1a. Investment is a voluntary activity. Investment will only occur if the expected rate of return justifies the risks involved. The plain language of the U.S. Supreme Court's opinions on return standards for utilities is consistent with this principle. These opinions focus on (1) the returns investors could earn if they put their money elsewhere at a comparable level of risk, and (2) the company's financial integrity. Whatever the legal reasons for these standards (which I understand to arise out of the Constitutional prohibition against the uncompensated taking of property), they recognize basic economic reality: **you can't push on a rope**, and you can't force investors to throw good money after bad.[5]

[5] Phrases in boldface in this introduction are titles to later sections.

1b. Therefore, policies that systematically deny utility investors a fair opportunity to earn the cost of capital achieve a short-run gain for today's customers, but at a material long-run cost to future customers and possibly to the economy of the jurisdiction involved. Once the long-run costs emerge, they cannot be overcome in a hurry. Investors, once burned, will be loath to trust that the regulatory jurisdiction won't repeat the same pattern should it ask for quick investments to shore up a system that the previous policies let decay. The safest way for once-burned investors to avoid inadequate returns on future major investments is to keep the system capital-starved. Research shows that nations around the world that do not protect investor rights have less investment and more costly conditions imposed on the investment that is made, to the detriment of their economies. States that make investment unattractive or unremunerative risk the same fate.

2. *Interpretation of the Allowed Rate of Return*

The return investors actually expect to earn is what matters. If a regulatory mechanism claims to allow one rate of return but actually allows a lower one on average, the lower one is what must pass the comparable return standard. If I promise to pay someone $10 to wash my car but s/he has learned I always actually pay 10 percent less than I promise, that person will assume the actual payment will only be $9, and s/he will wash my car only if $9 is enough. The phantom dollar in my stated payment is irrelevant, because **empty promises buy nothing**. (The same problem arises if I pay the $10 most of the time but welsh and pay nothing 10 percent of the time. In that case, the expected payment would again be $9, not $10.)

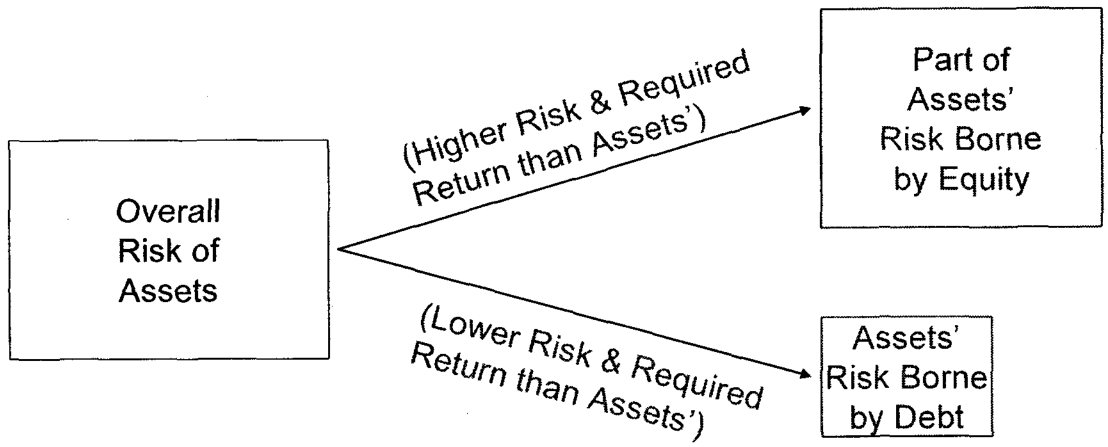
3. *The Market-to-Book Ratio Test*

At one time, it was reasonable to believe that a market-to-book ratio above (below) one signaled an expected rate of return on book value above (below) the utility's cost of capital. That time has passed. The 1987 stock market crash and the recent "tech bubble" are inconsistent with the model on which the market-to-book test relies. This conclusion is reinforced by the high market-to-book ratios currently observed for rate-regulated companies. If the market-to-book ratio test were valid yet such market-to-book ratios existed, the implied true costs of equity for the rate-regulated companies would be unreasonably low. How low depends on the precise assumptions, but in many cases they would be below the cost of long-term government debt. The implied true costs of equity can even be negative. Therefore, **the market-to-book ratio test cannot be right**. In practice, the forces driving market prices are more complicated than the simple model that underlies the market-to-book ratio test assumes.

4. *The Effect of Debt on the Cost of Equity*

4a. To understand fully the effect of capital structure on the cost of equity, it is useful to start from first principles. As Figure 1 illustrates, companies raise money for investment by issuing securities.[6] Different securities have different claims on the firm's earnings, and if necessary, on its assets. Debt has a senior claim on a specified portion of the earnings. Common equity, the most junior security, gets what's left after everyone else has been paid. Since equity bears more risk, investors require a higher rate of return on equity than on debt. Except at extreme debt levels, the overall level of risk of the firm does not change materially due to the addition of debt. The various securities just divvy that risk up.

The Overall Risk of a Company's Assets is Split between Equity (higher risk) and Debt (lower risk)



Key Points:

1. Overall firm risk does not change materially with modest levels of debt, it merely is divided among the firm's securities.
2. The higher the risk, the higher the rate of return required to induce investors to bear it. Equity bears most of the risk and so requires a higher rate of return.

Figure 1

4b. When a company uses modest amounts of debt, the overall risk of the company's assets falls on a fraction of its capital, the equity. The required return per dollar of equity goes up. Suppose changes in some market-wide economic factor normally produce fluctuations within a band of plus or minus ("+/-") 2 percent of the market value of a company's assets. At 100 percent equity, these changes produce fluctuations of +/- 2 percent of the market value of the company's equity, too. But at a 50-50 market-value debt-equity ratio, the

[6] For those viewing this document in color, the convention in Figures 1, 2, 7 to 9 and 11 in this testimony is that blue represents equity, red represents debt, green represents increases in value, and yellow represents decreases in value.

same asset value fluctuations produce equity value fluctuations of +/- 4 percent. At a 75-25 market-value debt-equity ratio, these fluctuations become +/- 8 percent of the market value of the company's equity. Figure 2 illustrates this point for debt-equity ratios of 0-100, 25-75, 50-50, and 75-25. Higher risk means a higher required rate of return, so *the cost of equity goes up at an ever increasing rate as a company adds debt*, which offsets the cheaper cost of debt. In short, **there is no magic in financial leverage**.

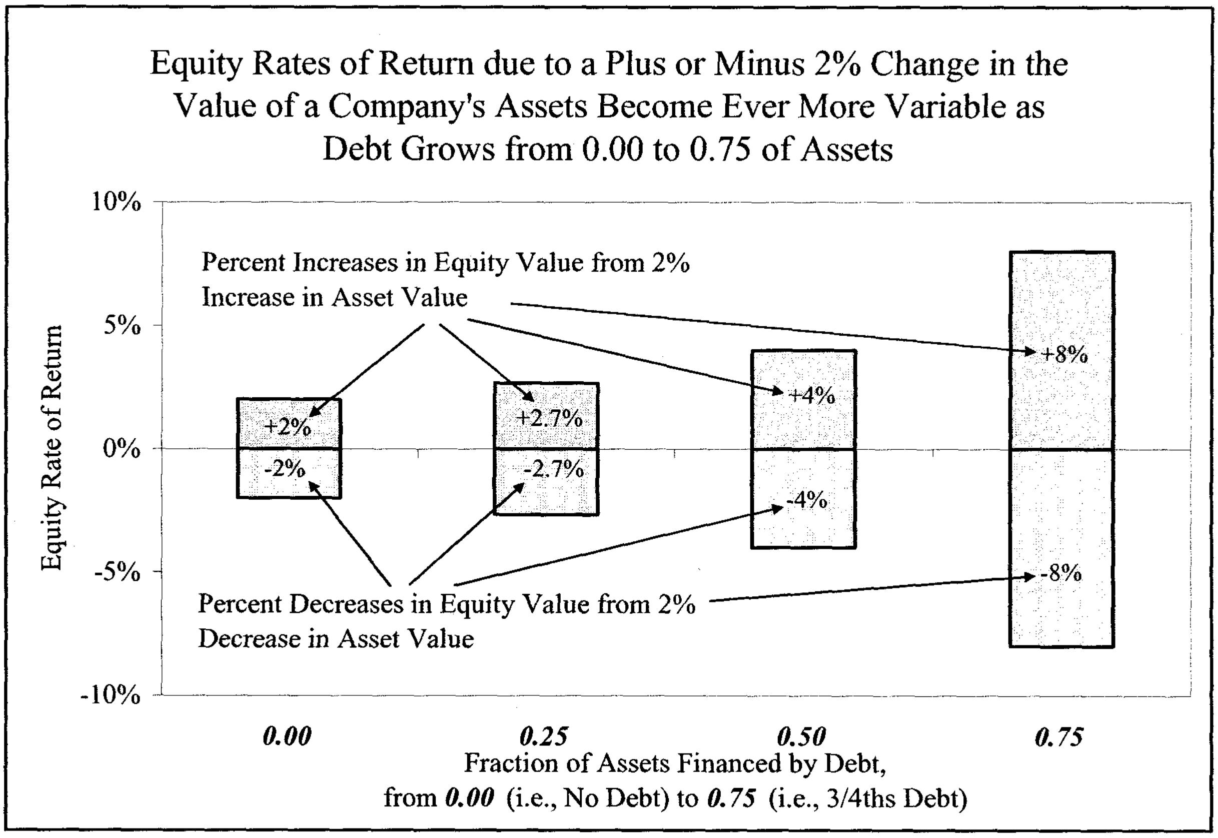


Figure 2

4c. An accurate estimate of the cost of equity for a rate-regulated company needs to consider (1) the levels of financial risk in the sample companies used to estimate the cost of equity and (2) how those levels compare to the level implied by the company's regulatory capital structure. The associated capital structure affects the estimated cost of equity estimate just as a life insurance applicant's age affects the required life insurance premium. An insurance agent wouldn't measure the required insurance premium for one person and charge the same premium to an otherwise identical person who was much older. Neither should a cost of equity analyst measure the cost of equity at one capital structure and apply the same cost of equity to a regulated capital structure with much more debt.

4d. As noted, the sample company's *market-value* capital structure determines the level of risk that a cost of equity analyst measures from market data, because market values determine the level of risk that equity bears due to debt. Example: suppose you buy a home for \$50,000 with a mortgage of \$40,000. Ten years later your home is worth \$100,000 and the mortgage is down to \$35,000. Your equity in the home is now \$65,000. If home prices then drop 10 percent, or \$10,000, your \$65,000 equity falls by that amount, and the resulting rate of return on your equity is -15 percent (= -\$10,000/\$65,000), versus -10 percent if you had no mortgage. The 15 percent loss would affect the measured risk of your home if it were represented by a publicly traded stock (e.g., the "beta" risk measure).[7] The "discounted cash flow" approach starts from the publicly traded price of your home, too, and that price reflects the level of risk borne in the market. The risk that underlies every cost of equity estimate based on market data *automatically* depends on the market-value capital structure of that company.

5. *Paradise Valley's Cost of Equity*

5a. These capital structure principles are particularly important for Paradise Valley. Figure 3 compares Paradise Valley's capital structure to that of water companies in recent Commission decisions. Paradise Valley has less equity than any of them. In fact, it has less than half as much equity than the average value for the six other companies in the figure. For reasons just explained, that means that for the same level of *business* risk, Paradise Valley's cost of equity will be higher than that of any of the other companies, and much higher than that of all but one of them, because **Paradise Valley's equity bears much more *financial* risk.**

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[7] If you kept books on the house, the book equity would be \$15,000 (the original \$50,000 less the current \$35,000 mortgage), or less if you were depreciating your investment. But a publicly traded stock for your house would not fall by \$10,000/\$15,000, or 67%, if housing prices fell 10 percent.

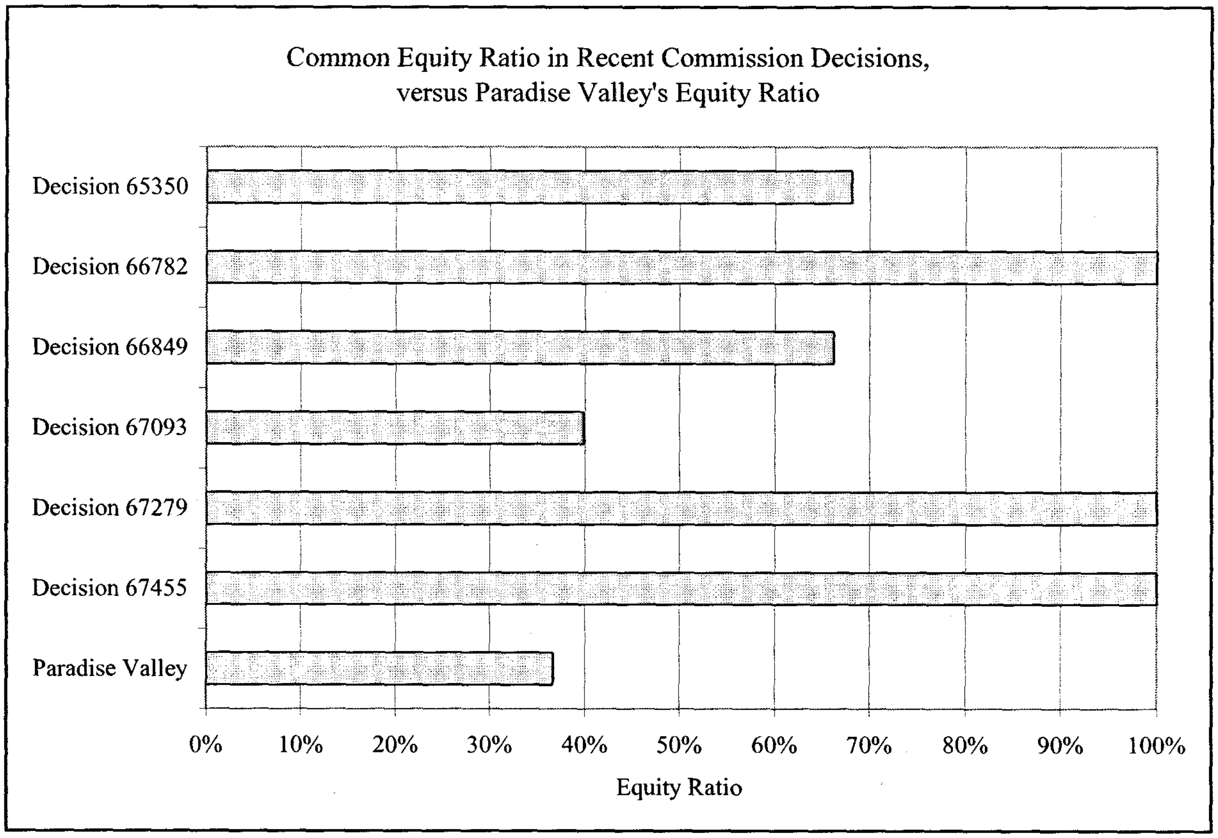

Figure 3

5b. Another way to state this point is to recognize that a given cost of equity for the other companies will cost their customers far more than the same cost of equity for Paradise Valley. A way to see this is to calculate the overall after-tax weighted-average cost of capital implied by these decisions (using current rather than embedded interest rates, to ensure an apples-to-apples comparison), and then to examine what cost of equity Paradise Valley would have to have at its capital structure to produce the same cost to its customers. Figure 4 shows the results of these calculations. Except for Decision 67093, the *lowest* cost of equity that would make Paradise Valley's overall return on capital as high for its customers as that approved in these other cases is nearly 14 percent. The highest is nearly 19 percent (for Decision 66782).

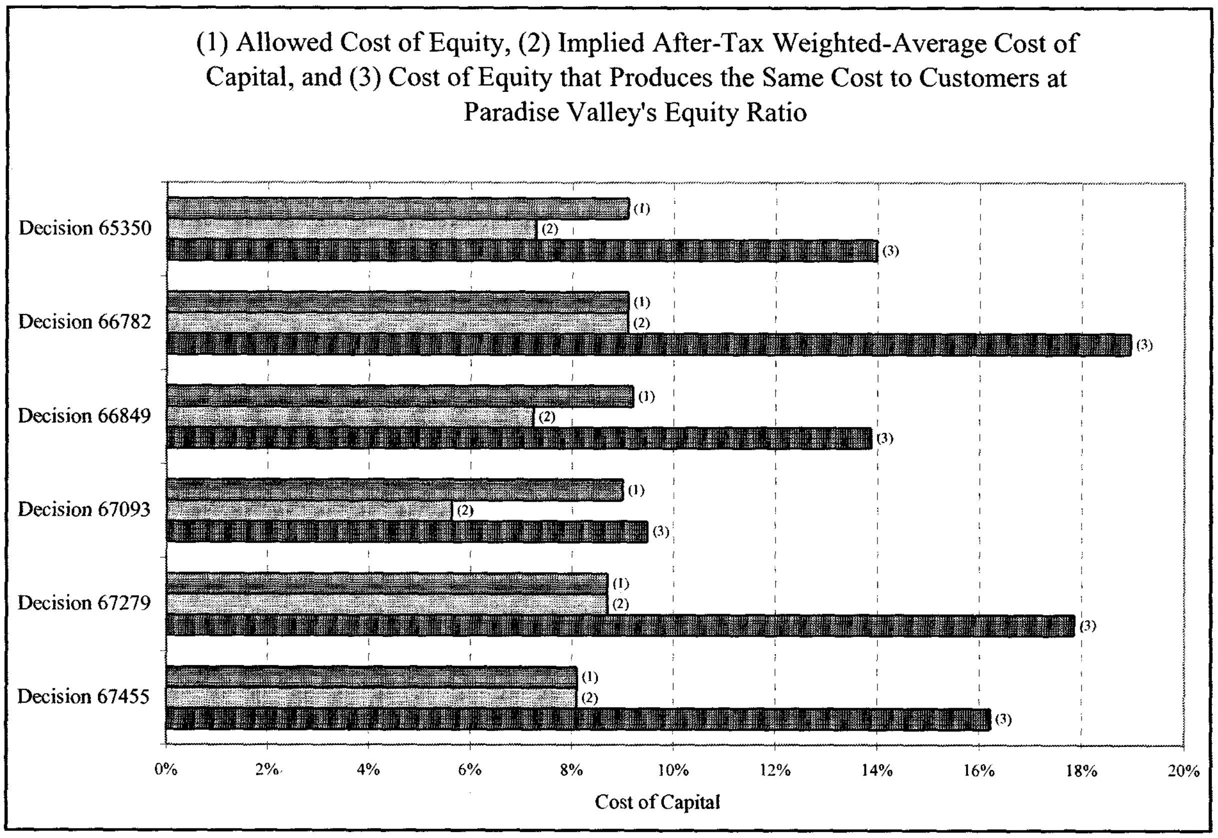

Figure 4

5c. I have reviewed Dr. Vilbert's analyses of the cost of equity of his sample groups. These analyses explicitly recognize the capital structure principles described above. Based on these analyses, I find Paradise Valley's cost of equity lies between 12 percent and 13 percent, given it's very low equity ratio. I believe the midpoint of this range 12½ percent, is the best point estimate of Paradise Valley's cost of equity. Figure 5 shows the resulting annual pre-tax cost to customers per $100 of rate base for the six Commission decisions and my recommendation (using Paradise Valley's current cost of debt and statutory tax rate to produce an apples-to-apples comparison). My recommendation produces costs to customers that (1) fairly reflect Paradise Valley's high financial risk, yet (2) are well below all but one of costs implied by the Commission's recent decisions.

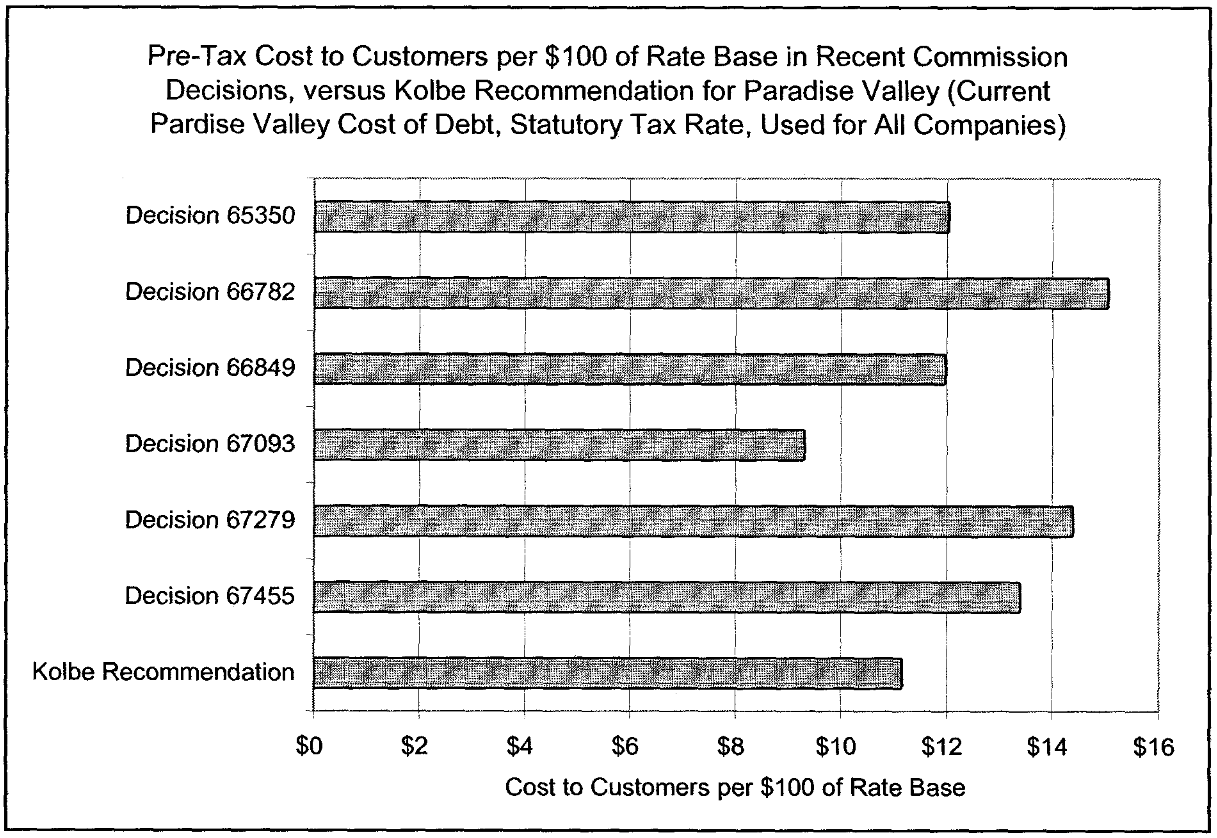

Figure 5

Q6. How is the remainder of your testimony organized?

A6. *Section II* addresses the conditions necessary for voluntary investment, point one above. *Section III* addresses the distinction between the allowed rate of return and the return investors require, point two above. *Section IV* addresses the market-to-book ratio test, point three above. *Section V* discusses the effect of capital structure on the cost of equity, point four above. (Appendix B provides additional information on this topic.) Finally, *Section VI* describes the basis of my recommended cost of equity range for Paradise Valley, point five above.

II. "YOU CAN'T PUSH ON A ROPE"

Q7. What is the purpose of the testimony in this section?

A7. The section discusses what is needed to induce investment by corporations in a market economy.

Q8. What is the nature of the corporate investment process?

A8. Investment by ordinary (i.e., non-financial) corporations is the process of turning a fungible and very liquid asset -- money -- into other assets that have at least as much value, but which are much less fungible and liquid. Examples of such other assets include automobile factories, water treatment plants, and research and development programs that companies hope will produce valuable patents.

Q9. How do corporations get money to invest?

A9. They must induce investors to provide it.

Q10. How do they do that?

A10. The inducement comes in the form of an expected return on the investors' money. The level of return investors require depends on the risk involved, which varies from industry to industry *because* some of the assets in which corporations invest are riskier than others.

That is, the expected rate of return investors can get if they keep their money in the bank or money-market funds is predictable and carries little or no risk. It also is low. The expected rate of return on the assets corporations build or buy with investors' money is less predictable and carries more risk, and sometimes much more. It also is higher, because investors require a higher expected rate of return to bear more risk. To attract capital, corporations must identify investments with an expected rate of return at least equal to that available to investors on alternative investments of equivalent risk.

Q11. How does all this relate to the legal standards for rates of return for rate-regulated companies?

A11. I am not an attorney, but the plain English of the U.S. Supreme Court's opinions appears to be in line with these economic principles. For example,

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public . . . equal to that generally being made . . . on investments in other business undertakings which are attended by corresponding risks and uncertainties. ... The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[8]

and

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. [Citation omitted.] By that standard, the return to the equity owner should be commensurate with return on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.[9]

I read these passages as establishing a two-part standard. First, the expected rate of return for investors in a rate-regulated company should equal that available in other investments of equivalent risk. Second, the return should be adequate to maintain the financial integrity of the

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8 *Bluefield Waterworks & Improvement Co. v. Public Service Commission*, 262 U.S. 679 (1923) at 692-693.

9 *Federal Power Commission v. Hope Natural Gas*, 320 U.S. 591 ("*Hope*") at 603.

company. Both parts of this standard make good economic sense, since you can't force investors to put their money into a venture. The very fact that such legal standards exist makes good economic sense, too.

Q12. Please explain the last statement.

A12. There is presently an active corporate finance literature that documents the impact of international differences in enforceable legal rights on the health of a nation's financial markets and the level of investment. Two quotations from that literature summarize some of the relevant findings:

> Recent research reveals that a number of important differences in financial systems among countries are shaped by the extent of legal protection afforded outside investors from expropriation by the controlling shareholders or managers. The findings show that better legal protection of outside shareholders is associated with: (1) more valuable stock markets ... ; (2) a higher number of listed firms ... ; (3) larger listed firms in terms of their sales or assets ... ; (4) higher valuation of listed firms relative to their assets ... ; (5) greater dividend payouts ... ; (6) lower concentration of ownership and control ... ; (7) lower private benefits of control ... ; and (8) higher correlation between investment opportunities and actual investments .... [Omitted citations indicated by ellipses.][10]

Also,

> Recent research suggests that the extent of legal protection of investors in a country is an important determinant of the development of its financial markets. Where laws are protective of outside investors and well enforced, investors are willing to finance firms, and financial markets are both broader and more valuable. In contrast, where laws are unprotective of investors, the development of financial markets is stunted. Moreover, systematic differences among countries in the structure of laws and their enforcement, such as the historical origin of their laws, account for the differences in financial development ... . [Omitted citations indicated by ellipses.][11]

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[10] Andrei Shleifer and Daniel Wolfenzon, "Investor Protection and Equity Markets," *Journal of Financial Economics* 66: 3-27 (October 2002), pp. 3-4.

[11] Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, "Investor Protection and Corporate Valuation", *The Journal of Finance* 57: 1147:1170 (June 2002), p. 1147.

This literature focuses on the possibility of expropriation by a country's citizens of minority investments made by outsiders, typically foreigners. The issue the Supreme Court addresses is the possibility of uncompensated takings by acts of government. But the key question is whether the investment is or is not at risk of being taken, not who the taker is. Investors are understandably reluctant to commit funds when such takings are possible, leading to less investment and to more costly terms for the investments that are made.

Q13. What do you mean by "takings" in this context?

A13. The answer to this question requires a bit of background on how an asset's risk may be allocated among different groups of customers.

Q14. All right, please go ahead.

A14. Investments in industry-specific corporate assets can be hostages to fortune. To sink fungible money into a non-fungible asset with few or no alternative uses, particularly one with a long life, is to assume a great deal of intrinsic risk. Companies sometimes choose to bear all of this risk and sometimes try to lay some or all of it off on other parties.

An example is a commercial building that might be used for office space or as a hotel. (Some buildings have both uses at the same time.) Commercial office space normally is rented out under long-term leases. The owner of the building gets a secure payment from the office space lessee, who thereby removes the owner's risk that the office space might lease at a much different rate or lie empty in a few years. Hotel space, in contrast, rents night to night. On hotel space, the owner bears the risk of bad times, in which fewer rooms will be booked and those that are booked will go for less money. The owner hopes to more than make up for such losses in good times, when more rooms are full and daily rates are higher.

The owner of a building with both office space and hotel space thus lays off some of his or her risk on office space lessees, but keeps the risk for the hotel space. The rents charged to office space lessees are lower than they would otherwise be precisely because the lessees are bearing this risk. Put differently, the cost of capital for office space is lower than the cost of capital for hotel space, and in a competitive market, the average rates for office and hotel space would reflect this difference.

Q15. How does this relate to investments by rate-regulated firms?

A15. Rate regulation often involves companies with long-lived assets with little or no alternative uses, and it therefore involves a great deal of intrinsic risk. The institutions of rate regulation pass much of this risk through to customers, in exchange for lower prices than they would otherwise have to pay. Investors' risk-bearing under rate regulation normally lies somewhere between the office-space and hotel-space extremes. Regulation denies regulated companies the right to make extra-high profits by charging premium prices in good times, and in exchange is supposed to protect the company from having to suffer from extra-low prices in bad times. It also is supposed to assure the investor a fair opportunity to recover all of the money sunk into the company's assets, through depreciation or amortization charges. Yet the company normally retains some risks, too. An example is gains or losses due to variations of sales from forecasted levels, which typically fall on the company between rate hearings, at which time new forecasts can be made.

Rate-regulated companies invest under the expectation that they will earn a return equal to the cost of their capital on average, i.e., that investors will have a fair opportunity to earn exactly the rate of return they could get on alternative investments of equivalent risk. That cost of capital is lower than in most industries precisely because of the constraints imposed by rate regulation. Nonetheless, it is higher than office space lessees command, because rate-regulated companies bear more risk than a building owner does from an office lease.

Q16. With that background, would you now explain what you mean by "takings"?

A16. Yes. First, I will note again that I am not an attorney, and I am not attempting a legal definition of the term. Economically, however, a "taking" of regulatory property in the sense used above would occur when the terms of regulation were changed so as systematically to deny to investors a fair opportunity to earn the cost of capital *after* the investors have sunk their money in non-fungible rate-regulated assets.

If it were known in advance that regulators would mark regulated rates down to unremunerative levels right after major investments had been made, for example, investors would invest less than if they believed the returns would be adequate; possibly they would not invest at all. If the policy of unremunerative returns were known in advance, the company's service quality would be lower, and service would be less available and/or more expensive than it would otherwise have to be. Therefore, a change to the terms of regulation to deny a fair opportunity to earn the cost of capital after the fact would get higher service levels without paying for them, and that would constitute a taking from an economic perspective.[12] Whether legal or not, such an act would achieve a short-run benefit for today's customers at a material long-run cost to future

[12] From an economic perspective, there is little to distinguish between changing the terms on which capital was invested after the fact and notifying the laborers finishing up on a construction project that they weren't going to receive their final paycheck, or that they would get it but at a much lower wage. The cost of capital is as much a real cost as wages.

customers. The research cited above suggests the long-run cost could be material for the state's economy, too.

Q17. But would not a commission's need to balance customer and investor interests mean that the rate of return on equity should be lowered, especially if overall rates are high due to new investments?

A17. No, not if the result is an expected rate of return on equity that is below the cost of capital. As noted in the footnote to the last answer, the cost of capital is as much a real cost as workers' wages. From an economic perspective, cutting the return on equity because new investment makes costs high is no different from cutting the wages of a utility's workers because costs are high. Workers who were satisfied with the wage before the cut would look for better opportunities after the cut, and some would find such opportunities and quit. The deeper the cut, the larger the proportion of workers who would quit. Investors would have an even easier time finding better opportunities, because the stock market is full of investments that offer an expected rate of return equal to the cost of capital (which varies with the risks of the particular stock). With an allowed rate of return below the cost of capital, managers who act in their shareholders' interests would try to avoid putting any more capital into the now unremunerative line of business, with material long-run consequences. That would not be in the best interest of customers, any more than would a utility's being unable to operate or to maintain its service quality because it could not attract workers at the wages it was allowed to offer.

Q18. If the gain is now and the cost is in the long-run, why worry about it? Is not that a problem for the future?

A18. It is always possible for one generation to live well and leave future generations to pick up the tab, and economists have no particular claim to expertise with the ethical questions generated by such decisions. However, we can try to help make sure the questions are resolved with a complete understanding of the tradeoffs involved.

In my experience, rate-regulated companies, like the institutions of regulation itself, have a great deal of inertia. They are like oil supertankers, which take a great deal of time to turn if trouble looms, but which then take at least as much time to get back on the original course.

Regulated companies' managers tend to want to provide service when it's requested, trusting to the regulatory process to perform acceptably for their investors on average. Therefore, they may not react immediately to the full extent possible if the regulatory process stops doing so. They certainly react less quickly than competitive firms to signals that a previously remunerative market no longer is generating an adequate return.[13] And even after managers do react and slow or stop new investment, the long-lived nature of regulatory assets can mean existing services take a long time to decay. Therefore, the adverse impacts of a regulatory policy that systematically denies investors a fair opportunity to earn the cost of capital are likely to take awhile to become material, which can lead to the mistaken impression that they will not do so.

Once the adverse impacts are manifest, however, they cannot be overcome in a hurry, any more than a supertanker can immediately resume its previous course. Not only would remedial investment take time, but also it would take longer to get started and/or be more expensive.

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[13] This is one reason that regulated firms can have so much trouble adapting to competition if it appears. See A. Lawrence Kolbe and Richard W. Hodges, "EPRI PRISM Interim Report: Parcel/Message Delivery Services," report prepared for the Electric Power Research Institute, RP-2801-2 (June 1989), reprinted in S. Oren and S. Smith, eds., *Service Opportunities for Electric Utilities: Creating Differentiated Products*. Boston: Kluwer Academic Publishers (1993).

Q19. Why is that?

A19. Investors, once burned, will be loath to trust that the regulatory jurisdiction in question won't repeat the same pattern if regulators subsequently ask for quick investments to shore up a system that the previous policy let decay, or to extend service to new customers. The safest way for investors to avoid inadequate returns on future major investments in such a jurisdiction is to keep the system capital-starved. For example, the company might not invest unless regulators were willing to negotiate *ex ante* terms that assured a fair return on incremental investment, at least. Such negotiations at least take time and cost extra money. They also lead to a higher rate of return and/or to a shift of more risk to customers than could have been achieved by a policy of allowing the company a fair opportunity to earn its cost of capital all along.

Q20. But do not rate-regulated companies have obligations to invest to maintain service?

A20. I understand there can be such obligations, but I also know of the Supreme Court's interpretation of the prohibition against uncompensated takings. I am not an attorney, so I cannot say how fast or by what mechanism investors will be able to slow the rate of investment if they become convinced that the return will not be remunerative. I can say confidently, however, that if a rate-regulated company becomes convinced that its returns in a particular jurisdiction will systematically be inadequate in the future, the best thing it can do for its shareholders is to devise an optimal exit strategy from that jurisdiction. Moreover, whatever the legal form of that strategy, and whatever the direct costs to both investors and customers of its execution, it will also constitute a very negative signal to all companies considering investing in that jurisdiction in the future.

Additionally, even if the company in question stops short of an exit strategy, those most likely to pay attention to inadequate returns for one rate-regulated company are investors in and managers of other rate-regulated industries in the jurisdiction. They may grow cautions about new investment, also, even if they have not yet been affected directly. Rate-regulated industries tend to provide basic services, so a reluctance to invest in these industries, whether solely in the one directly affected or in all of them, is very likely to spill over to the rest of the jurisdiction's economy.

Q21. Please sum up.

A21. A decision to take systematically from today's investors to give service below cost to today's customers will create material problems for tomorrow's customers and very probably for the state's economy. The optimal strategy for investors in such a company is to keep it capital-starved, and possibly even to exit the jurisdiction. You can't force investors to throw good money after bad, any more than you can push on a rope. As time passes, that will lead to less reliable (and less extensive) service. Unfortunately, while systems consisting of long-lived assets take a long time to "break," once "broken" they also take a long time to fix. Moreover, tomorrow's investors will not put up new money to fix such systems on the old terms. Even after such a system is restored, it will cost tomorrow's customers more than it would have without the initial decision to take from today's investors.

III. "EMPTY PROMISES BUY NOTHING"

Q22. What is the purpose of this section?

A22. At heart, it addresses the difference between the cost of capital and the allowed rate of return.

Q23. What is the difference?

A23. The "opportunity cost of capital," or "cost of capital" for short, is defined as the expected rate of return in capital markets on alternative investments of equivalent risk. The cost of capital is the bare minimum rate of return necessary to attract capital and to compensate investors for a given level of risk, since that is what they could earn elsewhere without bearing any more risk. That is, it is the competitive market price for capital exposed to a given level of risk. To treat both investors and customers fairly, regulatory procedures should operate so the company expects to earn the cost of capital on the assets its investors' money has bought.[14]

The "allowed rate of return" is a regulatory parameter used to determine the revenue requirement. Typically, the allowed rate of return is set equal to regulators' estimate of the cost of capital. The issue for this section is whether the mere setting of the allowed rate of return equal to the cost of capital actually permits investors to expect to earn the cost of capital, even if all parties were to agree that regulators had estimated the cost of capital perfectly.

Q24. Why wouldn't it?

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[14] A potential exception to this rule is "incentive regulation." Under incentive regulation, the company may be able to expect to earn more than the cost of capital for a period of time *if* its managers are able to find innovative ways to cut costs. Customers benefit after this period ends (or sometimes right away, according to a predetermined sharing formula) when costs are lower than they would otherwise have been.

A24. An allowed rate of return equal to the cost of capital lets the company expect to earn the cost of capital if and only if the company expects to earn the allowed rate of return. If the jurisdiction's regulatory procedures are designed so the company actually expects to earn less than the allowed rate of return, then it expects to earn less than the cost of capital, too.

Q25. You keep referring to the "expected" rate of return or the return the company "expects" to earn. Precisely what do you mean by "expect"?

A25. I mean the average value. The term "expected" is from statistics, and denotes the mean of the distribution of possible returns or rates of return.[15]

Q26. Why do you raise this topic?

A26. I understand Paradise Valley has not earned its allowed rate of return in quite some time. The testimony of David Stephenson addresses the specific reasons for this shortfall, but the mere fact of its existence raises the possibility that investors will not expect to earn the allowed rate of return under the current regulatory arrangements. Fair treatment of both investors and customers means that rate-regulated companies should expect to earn the cost of capital on average. If a company

[15] My testimony uses "expect" and "expected" only in the statistical sense:

> . . .the idea of expectation of a random variable is closely connected with the origin of statistics in games of chance. Gamblers were interested in how much they could "expect" to win in the long run in a game, and in how much they should wager in certain games if the game was to be "fair." Thus, expected value originally meant the expected long-run winnings (or losings) over repeated play; this term has been retained in mathematical statistics to mean the long-run average value for any random variable over an indefinite number of samples. This holds whether a large number of samples will actually be conducted or whether the situation is a one-trial affair and we consider hypothetical repetitions of the situation. Over a long series of trials, we can "expect" to observe the expected value. At any *single* trial, we in general cannot "expect" the expected value; usually the expected value is not even a possible value of the random variable for any single trial. . . .

W. L. Hayes, and R. L. Winkler, *Statistics*, Vol. I , New York: Holt Rinehart & Winston (1970) at 136-137.

does not expect to earn its allowed rate of return, than setting the allowed rate of return equal merely to the cost of capital shortchanges its investors, because the supposed opportunity to earn the allowed rate of return on average is actually an empty promise. Fair treatment of investors in such a case requires either changes to the regulatory mechanism so the company does expect to earn its allowed rate of return on average, or an allowed rate of return set enough above the cost of capital to make up for the expected shortfall between the cost of capital and the rate of return the company actually expects to earn.

IV. "THE MARKET-TO-BOOK RATIO TEST CANNOT BE RIGHT"

Q27. What is the market-to-book ratio test?

A27. The market-to-book ratio is supposed to indicate whether a utility expects to earn more or less than its cost of capital. In particular, for a utility regulated on a book-value rate base, a market-to-book ratio of 1.0 is supposed to indicate an expected rate of return on the book rate base equal to the utility's cost of capital. The test is based on the assumption that the value of a utility's stock equals the present value of the returns on (i.e., earnings) and of (i.e., depreciation) a rate base equal to the net book value of the utility's equity.[16]

Q28. That assumption does not sound very controversial. Is the market-to-book test valid?

A28. No, it turns out not to be valid, although I believed it was when writing a book published in 1984.[17] And even in 1984 there were a number of caveats concerning use of the market-to-book ratio to

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[16] See, for example, Kolbe, Read and Hall, *op. cit.*, pp. 25-33, 85-91.

[17] *Ibid.*

test utility rates.[18] Since that time, however, the market has behaved in ways that are plainly inconsistent with the simple pricing model on which the market-to-book ratio test rests. It is now clear that the market-to-book ratio test does not work.

Q29. Before you address the changes since your book was published, please identify the "caveats" concerning use of the market-to-book ratio test that existed even in 1984.

A29. First, even when we were able to believe in the validity of the market-to-book ratio test, we knew that the test could work only for companies that consisted entirely of regulated businesses with a rate base equal to net book value. The test never was believed to work for unregulated businesses. The pattern of cash flows over the life of an unregulated investment is quite different from that of an investment regulated on a net book-value rate base.[19] In a competitive equilibrium with inflation, that means market values will generally exceed book values for unregulated firms. The deviations may be even greater in the actual world.

Second, even for (1) a pure-play utility with a rate base equal to net book value, with (2) a true market asset pricing model that would yield a market-to-book ratio of one for such a utility in equilibrium, the regulatory process may act with a lag that leaves market-to-book ratios substantially different from one for long periods of time.

Third, even for (1) a pure-play utility with a rate base equal to net book value, with (2) a true market asset pricing model that would yield a market-to-book ratio of one for such a utility in equilibrium, regulators could not try consciously to target a market-to-book ratio of one in setting the allowed rate of return. The reason is that once investors discovered this policy (whether

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[18] *Ibid.*

[19] See, for example, Stewart C. Myers, A. Lawrence Kolbe and William B. Tye, "Inflation and Rate of Return Regulation," *Research in Transportation Economics*, Volume II. Greenwich, CT: JAI Press, Inc. (1985).

through public pronouncements or analysis of the results of confidential deliberations), investors would take it into account in pricing the stock. That would change the market-to-book ratio, thereby contaminating the information regulators would need to implement the policy. Regulation that consciously tries to set an allowed rate of return that makes the market-to-book ratio equal one is circular. This circularity existed even before the market taught us that we could no longer believe in the market-to-book test, and even for companies in circumstances that we would have believed would make market-to-book test valid.

Q30. Please now identify the actions of the market that have led you to conclude that the market-to-book ratio test "does not work."

A30. The stock market has taught us that the true, unknown, model or models that drive stock prices is (are) more complicated than the simple models that give rise to the market-to-book test. That means we can no longer trust that the market-to-book test would actually work even for a pure-play utility regulated entirely on a rate base equal to net book value, in equilibrium.

Specifically, the stock market forced me to change my view of the value of the market-to-book ratio for a steady-state, pure play utility with a book-value rate base when it crashed in October 1987.[20] The stock market bubble of the late 1990s and 2000 has only reinforced this conclusion.

In an attempt to explain how the market's level could change so much in such a short period, Prof. Stewart C. Myers wrote a paper[21] that argues that the stock market is good at getting relative prices right, because a great deal of money can be made in riskless arbitrage if securities

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[20] For the record, I am not claiming an epiphany. It took several years for me to understand the implications of the crash in the context of rate regulation.

[21] Stewart C. Myers, "Fuzzy Efficiency," *Institutional Investor*, December 1988.

are mispriced relative to one another. However, the stock market is not able to get absolute prices right, except in a "fuzzy" way.[22]

The market-to-book ratio purports to be a test of absolute value for utilities. If the stock market can get relative prices right, and if any stock has a reliable test for its absolute value, then all stocks will be priced right relative to it, and all stocks will be priced right in absolute value, too. If this were true, the stock market wouldn't have crashed in October 1987, nor would the turn-of-the-century "tech bubble" have happened. Since those events did happen, the supposed test of absolute value for utilities, i.e., the market-to-book ratio test, must not be valid. The unknown "true" model(s) of stock market prices in practice must be richer and more complicated than assumed in the simple derivation of the market-to-book test.

Q31. Can the other potential problems you mentioned explain current market-to-book ratios in ways that preserve the market-to-book test?

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[22] Nobel laureate Paul A. Samuelson expressed a related view in a letter to Profs. Robert Shiller and John Campbell:

> Modern markets show considerable *micro* efficiency (for the reason that the minority who spot aberrations from micro efficiency can make money from those occurrences and, in doing so, they tend to wipe out any persistent inefficiencies). In no contradiction to the previous sentence, I had hypothesized considerable *macro* inefficiencies, in the sense of long waves in the time series of aggregate indexes of security prices below and above various definitions of fundamental values. ... Long swings are long in time but *that* doesn't get them corrected with increasing confidence on the part of observing scientist.

> Quoted from Robert J. Shiller, *Irrational Exuberance*, New York: Broadway Books (2001), p. 243, emphases in the original.

More generally, Prof. Shiller and others have produced a growing literature that questions the notion that stock prices are determined in accord with simple models such as the present value formula. Our basic understanding of stock price formation has proven inadequate to explain the actual data we observe.

A31. No. For example, I believe that in recent years there have been companies that are essentially entirely regulated water utilities with market-to-book ratios in the 1.5 to 3.0 range. Those numbers are too high to be the result of regulatory lag in, for example, commissions' adjusting the allowed rate of return on equity in response to declining interest rates.

Q32. Why do you say that, when interest rates have been coming down for quite awhile now? Could not it be that for utilities, at least, the basic model still fully explains stock prices and the market-to-book ratios we observe are simply a result of a slow adjustment of allowed rates of return to interest rate declines?

A32. Unfortunately, such a view is not supportable. Suppose you observe a pure-play utility with a book-value rate base and a market-to-book ratio equal to 2.0. Then investors are paying \$2 now for stock value that will be brought down to \$1 as soon as regulators catch up with the interest rate declines. That amounts to a −50 percent return on the initial investment, which under this assumption must be recovered through the excess of the allowed rate of return over the cost of capital during the years before regulators catch up. Put this way, the notion seems implausible on its face. But we can be more quantitative about why the explanation of regulatory lag is unsupportable.

Q33. How?

A33. Assume that the market-to-book test worked, that a cost of capital analyst estimated the cost of equity is 10 percent, and that the relevant commission accepted the estimate and set the allowed rate of return at 10 percent. However, suppose the utility's market-to-book ratio is 2, which if the market-to-book test were valid would signal that 10 percent is above the cost of equity. Suppose also that the book value of the utility is expected to grow at a long-term annual rate of 5.3 percent. Lastly, suppose that investors expected an extreme form of regulatory lag: regulators will leave allowed rates of return at the current 10 percent level for X years. On the last day of the Xth year, regulators will readjust the allowed rate of return down to the cost of equity, so the market-to-book ratio goes down to 1.0 on that day. In short, the assumptions are that (1) investors put up $2 now for every $1 of book equity rate base, (2) earn an allowed rate of return of 10 percent (which by hypothesis is above the cost of capital) on the equity rate base (which grows at 5.3 percent per year) for X years, and (3) then end up with a stock value equal to only to the book-value rate base. Thus, they lose 50 percent of their original investment after X years.

If the market-to-book test is assumed valid, the discount rate that makes the present value of these hypothesized returns equal to twice the book value of the stock is the utility's true cost of equity. Figure 6 plots the implied true cost of equity associated with values of "X" running out to 20 years. As benchmarks, it adds the hypothesized 10 percent allowed rate of return on equity and Dr. Vilbert's long-term Treasury bond rate, 5 percent.

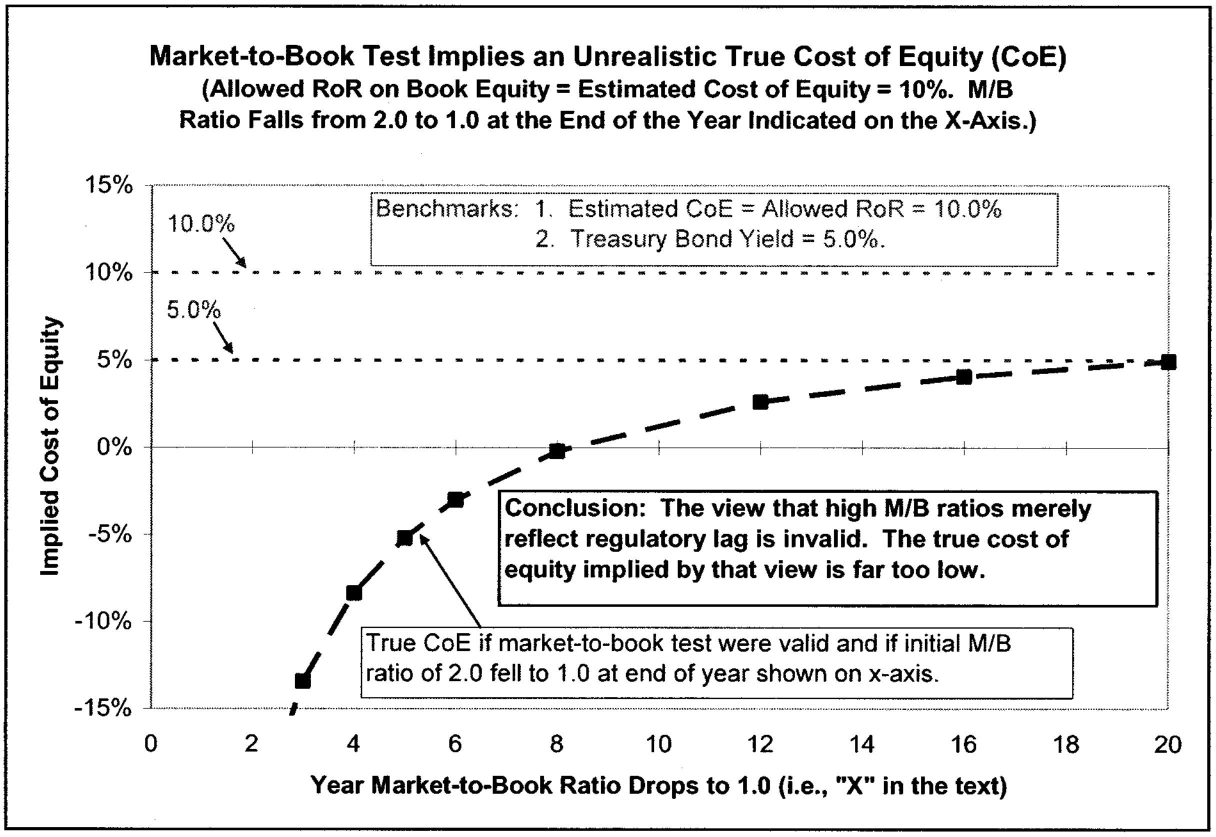

Figure 6

Q34. Please discuss Figure 6.

A34. The curving line indicated by long dashes with boxes (which is blue in color copies of this testimony) plots the true cost of capital as the length of regulatory lag (i.e., "X") grows from three years (the first value shown) to 20 years. With a loss of 50 percent of the original investment due to the end of regulatory lag, X must exceed 8 years for the true cost of equity even to be *positive*. It takes the full 20 years plotted in Figure 6 before the true cost of equity even equals the long-term Treasury bond rate, 5 percent.[23] Since the actual cost of equity must be well above the Treasury rate, regulatory lag cannot be the explanation for the market-to-book ratios we actually observe.

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[23] The top two lines in the figure, with small dashes (in green in color copies of this testimony), are the allowed rate of return on equity of 10 percent and the Treasury bond rate of 5 percent.

Q35. But suppose investors expect that regulators would never adjust allowed rates of return for the fall in interest rates in recent years. That is, suppose they believe the regulatory lag you just discussed is many decades long. Does that save the market-to-book test?

A35. If investors expected regulators to ignore falling interest rates for many decades, the implied true cost of equity would keep climbing as X gets further into the future, although it always would remain materially below the hypothesized 10 percent estimate of the cost of equity. It would be 6.9 percent with an X of 50 years, for example. But "saving" the market-to-book test by assuming that regulators effectively *never* react to the fall in interest rates is a cure that is worse than the disease. Nor is such an assumption supported by experience. Allowed rates of return for rate regulated companies were far higher in the 1980s, when interest rates were so high, than they are today. Yet the 1980s are a "mere" two decades ago. I would submit that it is far more plausible, after the experience of recent years, to believe that we do not understand the way stock prices are set than to believe that (1) we can model the stock price process exactly, but (2) investors today believe that regulators will ignore the implications of falling interest rates forever.[24]

Q36. Please sum up.

A36. It turns out that stock prices are more complicated than our simple models can encompass. As a result, the market-to-book ratio test lacks a firm conceptual foundation. Moreover, the levels of utility market-to-book ratios observed in recent years are simply too high to be the result of rational pricing based on the present value formula that underlies the market-to-book test.

[24] Reportedly, even Professor Eugene Fama has reached the conclusion that stocks can sometimes be irrationally priced. See "As Two Economists Debate Markets, The Tide Shifts; Belief in Efficient Valuation Yields Ground to Role Of Irrational Investors" *The Wall Street Journal*, October 18, 2004, p. A-1. Of course, we cannot be sure whether (1) the market is priced irrationally or (2) the market is priced rationally but is in accord with some model or set of models we do not yet understand. Either way, however, we can no longer rely on the market-to-book test.

Q37. What do you believe regulators should do about the market-to-book ratio?

A37. I believe regulators should focus on setting the allowed return according to the best evidence available and leave the market-to-book ratio to whatever (currently incompletely understood) forces drive the stock prices of the individual sample companies and the market as a whole.

V. "THERE'S NO MAGIC IN FINANCIAL LEVERAGE"

Q38. What is this section about?

A38. It addresses the effect of a company's use of debt on its cost of equity. As noted at the outset (recall Figure 1), when companies use debt they divide the risk of the assets up among the various types of security they issue. Equity bears the bulk of the risk, so the cost of equity goes up as debt is added to the capital structure.[25] Therefore, to compare validly the costs of equity from a sample of companies and the cost of equity of a regulated company, analysts must consider any differences among the equity risks generated by the various capital structures. This section explains this issue in more detail, using an everyday example.

Q39. Why do you address this topic?

A39. Proper interpretation of sample evidence on the cost of equity to set a regulated company's allowed rate of return on equity must control for differences (1) among the sample companies' market-value capital structures and (2) between those market-value capital structures and the capital structure used to set the revenue requirement. Otherwise, the cost of equity used to set the allowed rate of return on equity will not reflect the proper level of financial risk. This section of

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[25] Preferred equity acts much like debt in magnifying common equity's risk. However, it simplifies the discussion to focus on debt and common equity alone.

my testimony provides procedures to make these adjustments and explains their foundation in detail. Appendix B provides additional detail and a summary of the associated economic literature.

A. EXAMPLE OF WHY DEBT ADDS RISK TO EQUITY

Q40. Why does more debt mean more risk for equityholders?

A40. Debt magnifies the variability of the equity return. Let's consider a simple example. Most people who participate in regulatory hearings do own or will own a home at some point in their lives. Suppose someday you decide to take money out of your savings and buy a dwelling for $100,000. The dwelling's future value is uncertain. If housing prices go up, you win. If housing prices go down, you lose. Figure 7 depicts the outcome of a 10 percent fluctuation in the dwelling's price.[26]

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[26] As noted at the start of my testimony, for those viewing this document in color, the convention in Figures 1, 2, 7 to 9 and 11 is that blue represents equity, red represents debt, green represents increases in value, and yellow represents decreases in value.

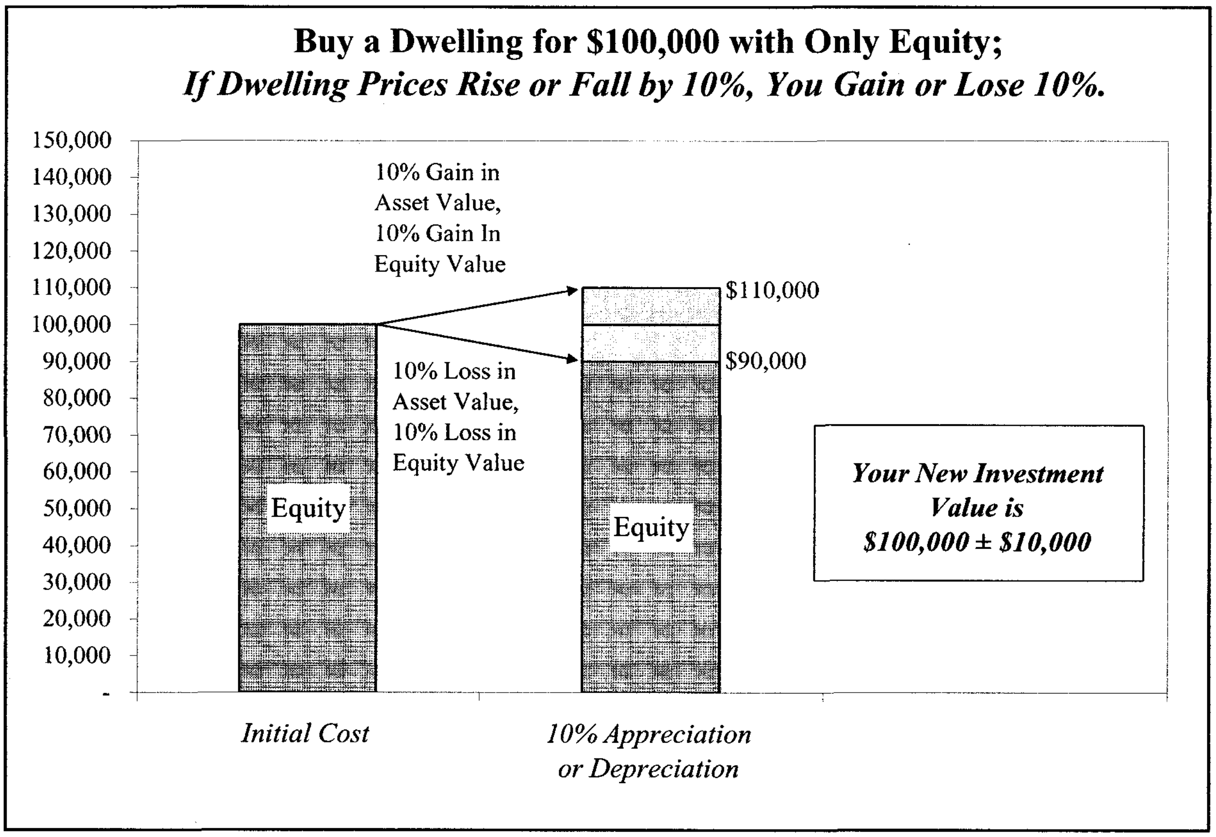

Figure 7

Now suppose you don't want to take the full $100,000 out of your savings, or you don't have that much saved, so you take out a mortgage for half the money you need to buy the dwelling. Your mortgage lender does not expect to share in the benefits of rising housing prices, nor to bear the pain of falling ones. You owe your lender the $50,000 you borrow either way. That means your equity investment bears the entire risk of changing housing prices. Figure 8 illustrates this effect.

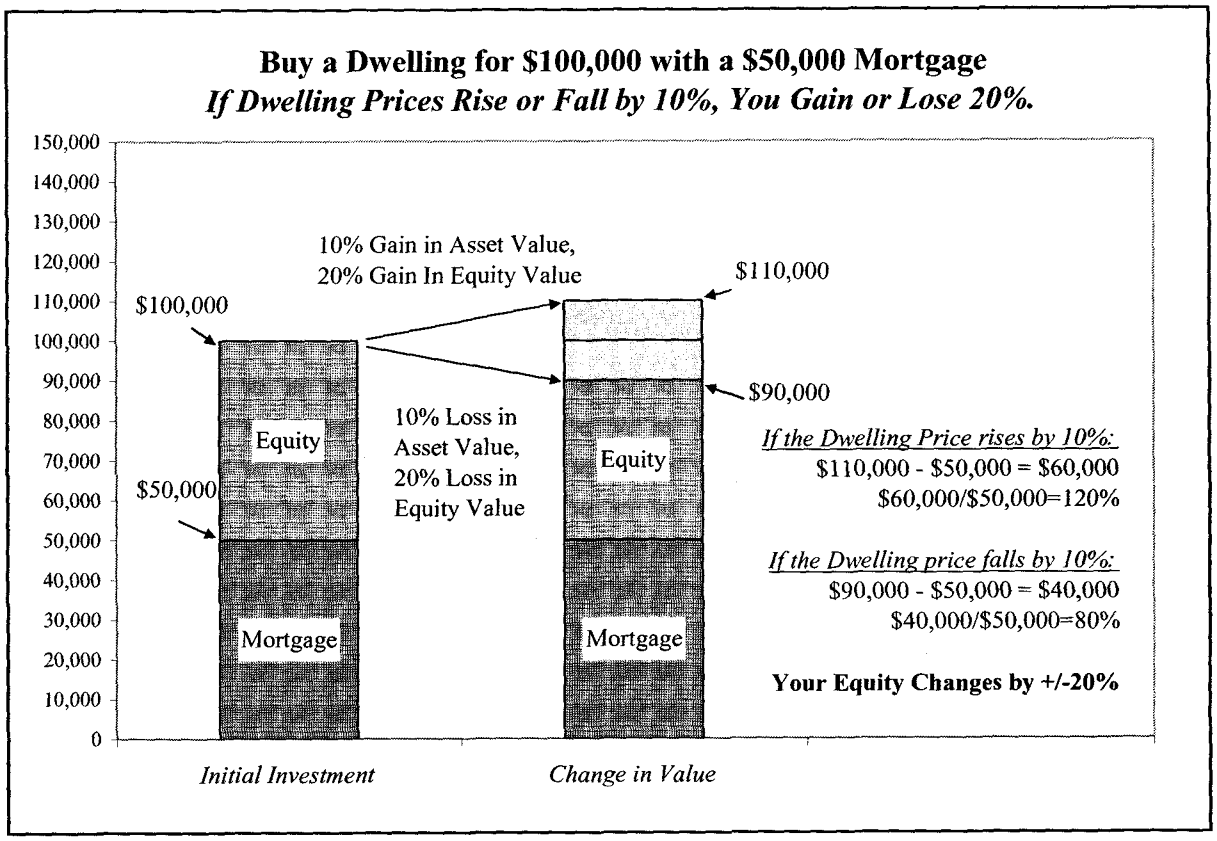

Figure 8

Now the variability of your equity return due to the dwelling's price fluctuations doubles. The entire variability of a 10 percent increase in housing prices now falls on the $50,000 in original equity.

Q41. Please show these calculations.

A41. All right. In Figure 7, if the price falls to $90,000, the rate of return on your equity due to the decrease was:

Figure 7: Rate of return on equity $= \frac{\text{(New Dwelling Value - Old Dwelling Value)}}{\text{Old } \textit{Dwelling} \text{ Value}}$

$= \frac{(\$90{,}000 - \$100{,}000)}{\$100{,}000}$

$= \frac{-\$10{,}000}{\$100{,}000} = -10\%$

But in the Figure 8 case, where you've financed half of the purchase price with a mortgage that you have to pay back regardless of the dwelling price change, the rate of return the equity part of the investment is

Figure 8: Rate of return on equity $= \frac{\text{(New Dwelling Value - Old Dwelling Value)}}{\text{Old } \textit{Equity} \text{ Value}}$

$= \frac{(\$90{,}000 - \$100{,}000)}{\$50{,}000}$

$= \frac{-\$10{,}000}{\$50{,}000} = -20\%$

Halving the amount of equity doubles its variability.

Q42. What happens if the mortgage is a different proportion of the initial dwelling price?

A42. The equity return gets ever more variable as the mortgage proportion grows. Figure 9 shows the outcome for mortgages that are 0 percent, 20 percent, 50 percent and 80 percent of the initial dwelling purchase price.

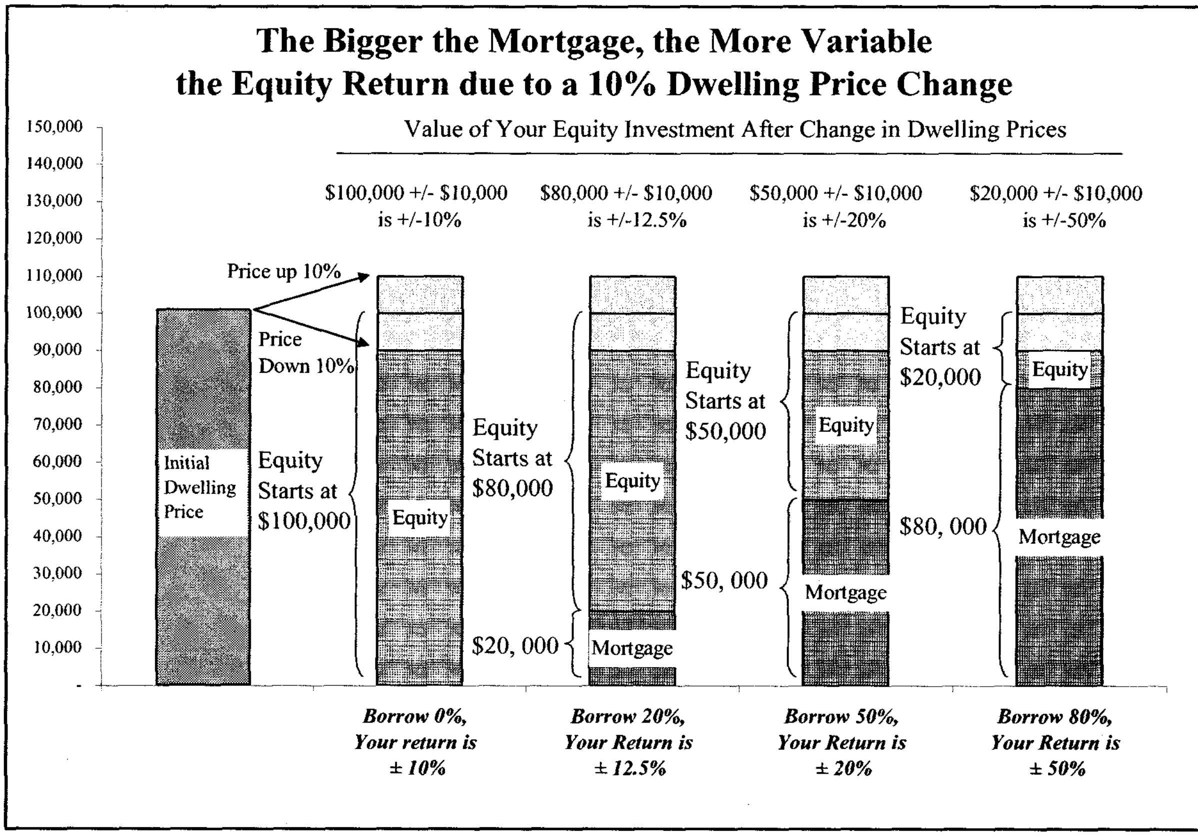

Figure 9

Figure 10 depicts the same point in a different way. It shows the growing variability of the equity return as the mortgage proportion increases for a more nearly continuous set of cases. The basic message is the same either way: a higher mortgage (more debt) means ever more risk for equity.

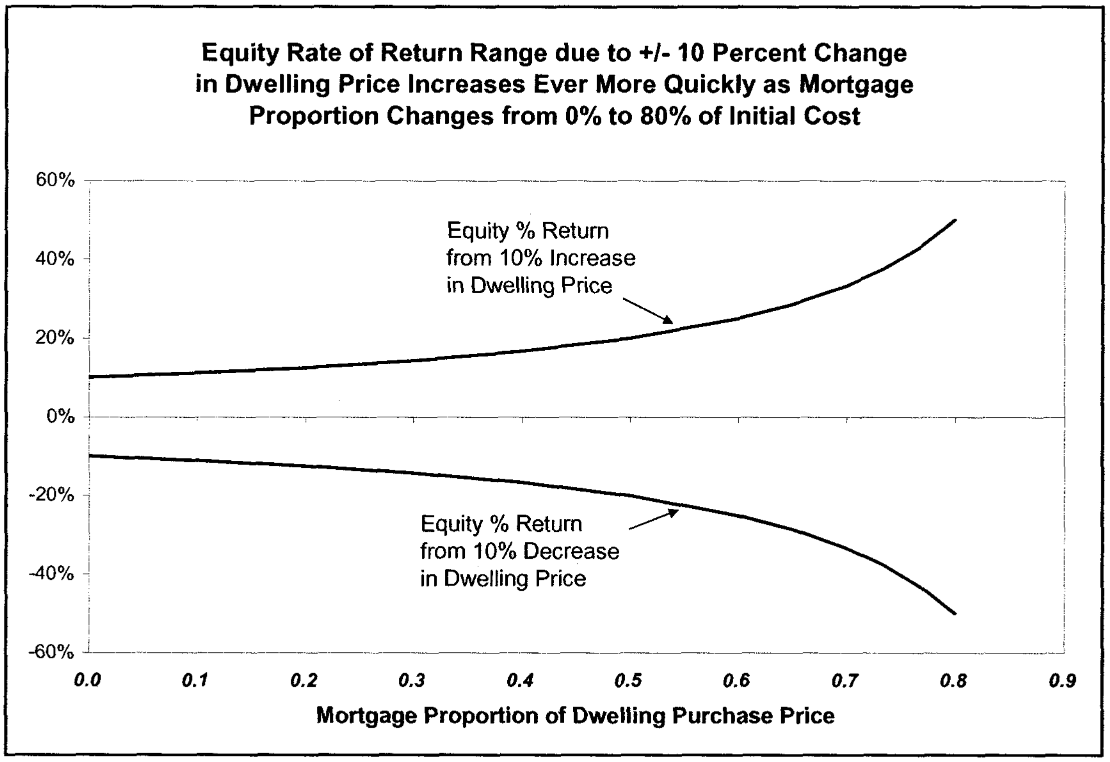

Figure 10

B. IMPACT ON THE COST OF EQUITY

Q43. What does all this mean for the cost of equity?

A43. Investors do not like risk. For the same expected rate of return on equity, rational investors would choose to be on the left edge of Figure 10, not somewhere to the right. No investor would choose an investment with an expected return of, say, 10 percent plus or minus 50 percent over one with an expected return of 10 percent plus or minus 5 percent. Investors demand a higher rate of return to bear more risk.

The messages of this example are simple:

1. ***Debt magnifies equity's risk.***

2. Debt magnifies equity's risk ***at an ever increasing rate.*** Therefore,

3. ***The required rate of return on equity goes up at an ever increasing rate as you add more and more debt.***

This is not only basic finance theory, it is the everyday experience of anyone who buys a home. The bigger your mortgage, the more percentage risk your equity faces from changes in housing prices. (Look again at Figures 8 and 9.) If you're willing to bear such financial risk without compensation, unlike other investors, there are millions of investors who would like to strike a deal with you to bear their risk for no reward. (I give an example in Appendix B.)

Q44. You've left a lot out of your example. How do rent, interest on the mortgage and taxes affect your three "messages"?

A44. *Not one word* of these three messages needs be changed to accommodate such factors. Such factors do affect the precise magnitude of the cost of equity and the precise way in which it changes as additional debt is added, but all three messages remain completely correct as stated regardless of these details. I show why in Appendix B.

Q45. Should you use market-value or book-value capital structures to assess the degree to which financial risk that affects the cost of equity?

A45. The market-value capital structure is the relevant quantity for analyzing the cost of equity evidence, not the book-value capital structure.[27] The variability of the equity in the dwelling

[27] The need to use market-value capital structures to analyze the effect of debt on the cost of equity has been recognized from the beginning of the financial literature on the topic. For example, the initial reconciliation of the Modigliani-Miller theories of capital structure with the Capital Asset Pricing Model, in Robert S. (continued...)

example depends on the market-value shares of the mortgage and the equity, not the book-value shares.

Q46. Please elaborate.

A46. All right. Suppose you bought your dwelling 10 years ago and you've been renting it out. Suppose depreciation has reduced the original book value from $100,000 to $75,000. Suppose also that you've paid off about 20 percent of the original mortgage, leaving 80 percent still owed. Suppose as well that your original mortgage was for 80 percent of the purchase price, or $80,000. That means your mortgage balance is now ($80,000 x 0.80) = $64,000. On a book value basis, you have $75,000 - $64,000 = $11,000 in equity.

What happens now if housing prices increase or decrease 10 percent? You cannot even start to answer this question unless I tell you how housing prices have changed over the last ten years. If I tell you that the market value of the dwelling is now $200,000, you can calculate a 10 percent change as $20,000. A 10 percent decrease in housing prices is therefore almost twice your book equity of $11,000. Does that mean a 10 percent decrease will wipe you out?

Of course not. Your real equity is the market value equity in your dwelling. Suppose interest rates are unchanged, so the market value of the mortgage equals its remaining unpaid balance. The relevant measure of equity for risk-reward calculations is

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[27] (...continued)
Hamada, "Portfolio Analysis, Market Equilibrium and Corporation Finance, *The Journal of Finance* 24:13-31 (March 1969), works with market-value capital structures. For a more recent presentation of the concept, see, for example, Richard A. Brealey and Stewart C. Myers, *Principles of Corporate Finance*, New York: McGraw-Hill/Irwin, 7th ed. (2003), at 525-26. Book values may be relevant for some issues, e.g., for covenants on individual bond issues, but as explained in the text, market values are the determinant of the impact of debt on the cost of equity.

$$\text{True Equity in Dwelling} = \text{Market Value of Dwelling} - \text{Market Value of Mortgage}$$

$$= \$200{,}000 - \$64{,}000 = \$136{,}000$$

Therefore, the percentage rate of return on equity due to a 10 percent change in dwelling values is

$$\text{Rate of Return on Equity} = \frac{\text{Change in Dwelling Value}}{\text{Starting Equity Value}}$$

$$= \frac{+/- \$20{,}000}{\$136{,}000}$$

$$= +/- 15\%$$

Figure 11 depicts the actual risk-return tradeoff after 10 years. A 10 percent decline in dwelling values would be painful, but it wouldn't come close to wiping you out, no matter what the books say. Nor would it even show up on the books, despite its still material impact on your actual investment

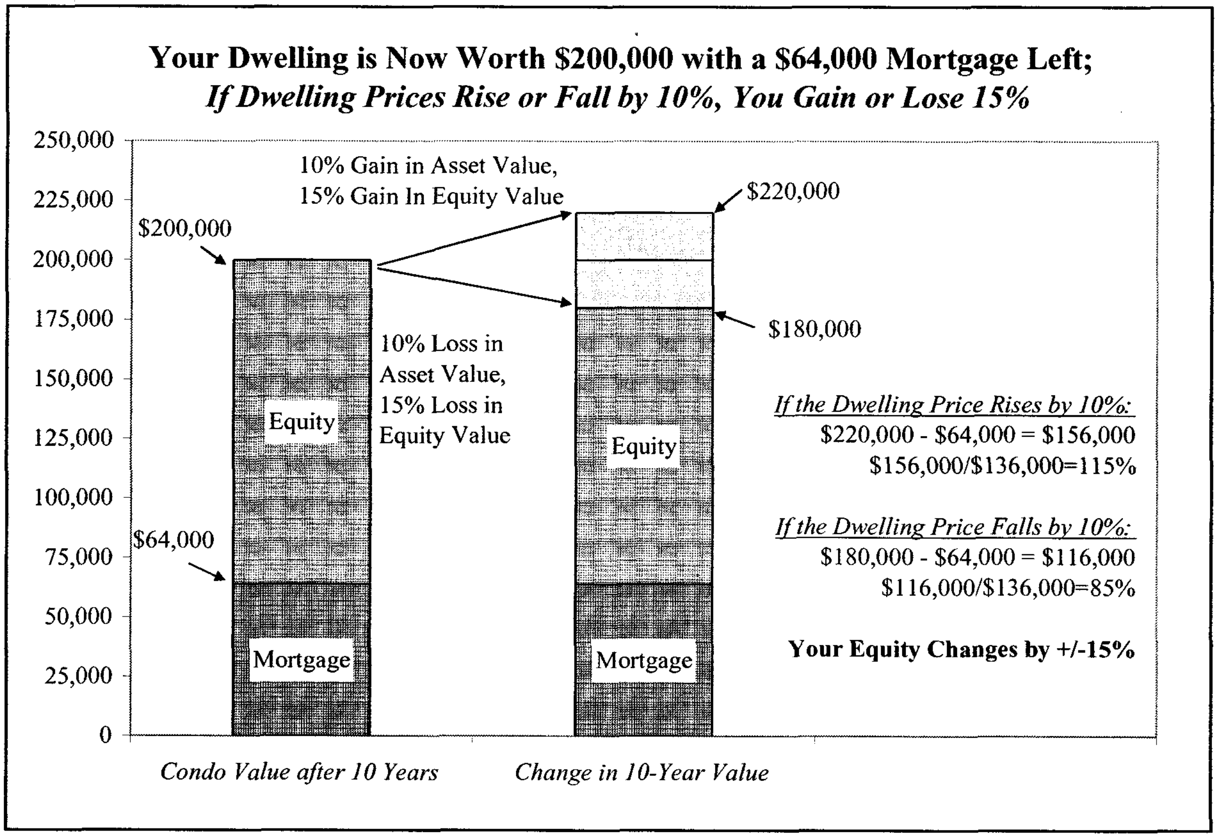

Figure 11

No landlord would assess his or her risk due to a mortgage by comparing fluctuating property values to the remaining book value of the property. The risk that debt imposes on the cost of equity is a function of relative market values, not relative book values.

Q47. Is use of market values to calculate the impact of capital structure on the risk of equity incompatible with use of a book-value rate base for a regulated company?

A47. No, no more than it is incompatible to use market-based cost of equity estimation methods (such as the Discounted Cash Flow method or the Capital Asset Pricing Model) with a book value rate base. That is, the cost of capital is the fair rate of return on regulatory assets for investors and customers alike. Most regulatory jurisdictions in North America measure the rate base using the net book value of assets, not current replacement value or historical cost trended for inflation.[28] But the jurisdictions still apply market-derived measures of the cost of equity to that net book value rate base.

The issue here is, what level of risk is reflected in that cost of equity estimate? That risk level depends on the sample company's market-value capital structure, not its book-value capital structure. *That risk level would be different if the sample company's market-value capital structure exactly equaled its book-value capital structure, so the estimated cost of equity would be different, too.*

Q48. Please explain this last point using the above example.

A48. All right. Suppose that you have refinanced your dwelling. While it still is worth $200,000 ten years after you bought it, your new market-value debt-equity proportions are consistent with the above example's book capital structure. That is, given an undepreciated book value of $75,000 consisting of $11,000 of equity and $64,000 of debt), your post-refinancing capital structure gives you a mortgage of [$200,000 x (64/75)] = $171,667 and equity of [$200,000 x (11/75)] = $29,333. Now a plus or minus 10% swing in housing prices gives you an equity rate of return of:

[28] Some jurisdictions (including, I understand, Arizona) use a "fair value" rate base. However, to my knowledge, standard practice in such jurisdictions is to set the allowed rate of return in a way that produces the same outcome as application of the cost of capital to a net book value rate base. (U.S. oil pipelines and railroads are exceptions to this rule.)

$$\text{Rate of Return on Equity} = \frac{\text{Change in Dwelling Value}}{\text{Refinanced Starting Equity Value}}$$

$$= \frac{\pm\$20{,}000}{\$29{,}333}$$

$$= \pm 68\%$$

Contrast this value with the +/- 15 percent above in Figure 11, in the case where the dwelling's market value had gone up the same amount but there was no refinancing. A cost of equity analyst who estimated the "beta" risk measure on a stock like this would get a much higher value than in the earlier example, because the stock would be much more volatile.[29] Exactly the same thing would happen for a utility. In short,

> ***Market values, not book values, determine the risk impacts of capital structure on the market cost of equity for all companies, even those regulated on a book-value rate base.***

Q49. Please sum up the implications of this section.

A49. The market risk, and therefore the cost, of equity depends directly on the market-value capital structure of the company or asset in question. It therefore is impossible to compare validly the measured costs of equity of different companies without taking capital structure into account. Capital structure and the cost of equity are unbreakably linked, and any effort to treat the two as separate and distinct questions violates both everyday experience (e.g., with home mortgages) and basic financial principles.

Q50. How should an analyst implement this principle?

[29] Technical note: debt magnifies the stock's entire variability, diversifiable and undiversifiable alike. Therefore, the stock's beta (or "betas," if more than one risk factor matters to investors) will in fact be affected by the company's market-value capital structure.

A50. As discussed further in my Appendix B, there has been a great deal of financial research on the effects of capital structure of the value of the firm. One of the key conclusions that result from the research is that no narrowly defined optimal capital structure exists within industries, although the typical range of capital structures does vary among industries.[30] Instead, there is a relatively wide range of capital structures within any industry in which fine-tuning the debt ratio makes little or no difference to the value of the firm, and hence to its overall after-tax cost of capital.

Accordingly, analysts should treat the market-value weighted average of the cost of equity and the after-tax current cost of debt, or the "ATWACC" for short,[31] as constant. Sample evidence should be analyzed to determine the sample's average ATWACC, which can be compared "apples to apples" across different firms or industries. The economically appropriate cost of equity for a regulated firm is the quantity that, when applied to the *regulatory* capital structure, produces the same ATWACC. That value is the cost of equity that the sample would have had, estimation problems aside, if the sample's market-value capital structure had been equal to the regulatory capital structure in question.

[30] An exception is very high-risk industries that should avoid debt entirely, which makes their optimal capital structure zero percent debt.

[31] This quantity typically is called the "weighted-average cost of capital" or "WACC" in finance textbooks. The textbook WACC equals the *market*-value weighted average of the cost of equity and the *after-tax*, *current* cost of debt. However, rate regulation in North America has a legacy of working with another weighted-average cost of capital, the *book*-value weighted average of the cost of equity and the *before-tax*, *embedded* cost of debt. Accordingly, in regulatory settings it's useful to refer to the textbook WACC as the "ATWACC," or "after-tax weighted-average cost of capital." I follow that practice here.

VI. "PARADISE VALLEY'S EQUITY BEARS MUCH MORE *FINANCIAL* RISK"

Q51. What is the purpose of this section of your testimony?

A51. This section explains the basis of my conclusion that Paradise Valley's cost of equity at its 36.7 percent equity ratio lies between 12 percent and 13 percent.

Q52. What are the steps in that process?

A52. Step one is to compare the rates of return on equity and the capital structures in recent water cases in Arizona relative to Paradise Valley's capital structure, as summarized in Figures 3 and 4 at the beginning of my testimony. Step two is to review the evidence in the Vilbert Testimony and reach a conclusion on the cost of equity for Paradise Valley.

A. PARADISE VALLEY RELATIVE TO RECENT COMMISSION DECISIONS

Q53. How did you obtain information on recent Commission decisions?

A53. I asked the company to supply me with the most recent data. Table 1 reports those data.

Table 1

Capital Structure and Allowed Rate of Return on Equity in Recent Arizona Water Decisions

Company	Decision Number	Date	Common Equity Percentage	Rate of Return on Equity
Bella Vista Water Company	65350	11/01/2002	68.1%	9.1%
Clearwater Utilities	66782	02/13/2004	100.0%	9.1%
Arizona Water Company	66849	03/19/2004	66.2%	9.2%
Arizona-American Water Co.	67093	06/30/2004	39.9%	9.0%
Rio Rico Utilities	67279	10/05/2004	100.0%	8.7%
Las Quintas Serenas Water Co.	67455	01/04/2005	100.0%	8.1%

Source: Provided by Arizona American.

Q54. What use do you make of these data?

A54. Paradise Valley has an equity ratio of 36.7 percent, lower than any of those shown in Table 1 and much lower than all but one of them. In fact, Paradise Valley's equity ratio is less than half of the average of the six values shown in Table 1. For reasons explained in the previous section of my testimony, that means Paradise Valley's equity has more financial risk than any of these companies, and much more than five of the six. To illustrate just how much more, I use the data in Table 1 to calculate the allowed rate of return on equity for the companies in the table that would correspond to the indicated decision, but at Paradise Valley's equity ratio.

Q55. Precisely what do you mean by "correspond to" in the previous answer?

A55. Here I focus on the cost of equity, so I want to put aside differences due to differences in the cost of debt. Therefore, my calculation assumes all of these companies had Paradise Valley's current market cost of debt. Then the total percentage amount their customers pay for the return on capital will equal the overall after-tax weighted-average allowed rate of return, grossed up for taxes.

Q56. Why?

A56. A utility's total return on capital is the sum of the rate of return on equity times the equity share of the rate base, plus the cost of debt times the debt share of the rate base, plus taxes on equity.[32] That sum equals the after-tax weighted-average rate of return times the entire rate base, all grossed up for taxes.[33] Therefore, the implied estimate of the cost of equity that corresponds to the amount customers actually pay for the return on capital under the above decisions, but at Paradise Valley's equity ratio, equals the cost of equity that produces the same after-tax weighted-average rate of return, using Paradise Valley's cost of debt.[34]

Q57. What are the results when you perform these calculations?

A57. Table 2 provides the answer.

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32 Here I assume that rate base equals net book value. I understand that this is not true in Arizona, but that the allowed rate of return on the rate base is calculated in a way that produces the same result as application of the cost of capital to a net book value rate base.

33 Mathematically, if V is the value of the rate base, E the amount of equity in the rate base, D the amount of debt, r^* the overall after-tax allowed rate of return, r_E the allowed return on equity, r_D the cost of debt, and t_C the corporate tax rate, $(V)r^*/(1\text{-}t_C) = (V)[r_E(E/V) + (1-t_C)r_D(D/V)]/(1-t_C) = r_E E + [t_C r_E E/(1-t_C)] + r_D D =$ after-tax income + taxes + interest.

34 I understand that Paradise Valley tends to have an unusually low cost of debt, so that the other companies' customers actually tend to pay more for the return on capital than assumed in this calculation. However, as noted earlier, here the focus is on return on equity.

Table 2

Rate of Return on Equity that Provides Same Cost to Customers at Paradise Valley's 36.7% Equity Ratio as that Allowed in Recent Arizona Water Decisions

Decision Number	Date	Common Equity Percentage	Allowed Rate of Return on Equity	Implied After-Tax Weighted-Average Cost of Capital	Equivalent-Cost Rate of Return on Equity
65350	11/01/2002	68.1%	9.1%	7.3%	14.0%
66782	02/13/2004	100.0%	9.1%	9.1%	18.9%
66849	03/19/2004	66.2%	9.2%	7.2%	13.9%
67093	06/30/2004	39.9%	9.0%	5.6%	9.5%
67279	10/05/2004	100.0%	8.7%	8.7%	17.9%
67455	01/04/2005	100.0%	8.1%	8.1%	16.2%

Source: First four columns provided by Arizona American. Fifth column calculated using Paradise Valley's current cost of debt and tax rate. Last columnn is the rate of return on equity that gives the indicated after-tax weighted-average cost of of capital.

Q58. What are the implications of Table 2?

A58. Table 2 means that if the Commission believes Paradise Valley's overall business risk is the same as that of the average of the companies in the recent decisions, Paradise Valley's allowed rate of return on equity should be 12.4 percent, excluding the three companies with 100 percent equity. If those companies are included, the average rate of return on equity at Paradise Valley's capital structure is 15.1 percent.

Q59. Why did you initially exclude the companies with 100 percent equity in the previous answer?

A59. As discussed in the last section, for companies that ought to use some debt, the overall after-tax weighted-average cost of capital is higher at 100 percent equity than it is in the middle range of capital structures. I would not recommend an allowed rate of return on equity that high for

Paradise Valley even if the Commission believed its business risk was the same as that of those companies, since it embodies a capital structure that would not be reasonable for Paradise Valley.

B. CONCLUSION ON PARADISE VALLEY'S COST OF EQUITY

Q60. How do you reach a conclusion on Paradise Valley's cost of equity?

A60. The primary evidence is the Vilbert Testimony. That testimony describes its findings and procedures in detail, so I will not review it here. I will note, however, that since the capital structure of Paradise Valley varies so dramatically from both that of Dr. Vilbert's sample companies and most of the companies involved in recent Commission decisions, I think it prudent to focus on the most basic quantity from Dr. Vilbert's analyses, the estimates of the after-tax weighted-average costs of capital.

I believe Dr. Vilbert's risk positioning estimates using the short-term interest rates deserve little or no weight at this time, since short-term interest rates are still anomalously low following the Federal Reserve's efforts to help the economy recover from the economic problems of recent years. I give little weight to the DCF results for Dr. Vilbert's water company sample, for reasons he describes, but the gas distribution company DCF results do not suffer from all of the same problems, and so deserve some weight, in my view. Additionally, I note and agree with Dr. Vilbert's comments on the overall level of interest rates at this time. Lastly, I have reservations about the estimates of beta values for utilities in recent years, which I believe understate the true risks utilities face. Given all of these considerations, I find that the after-tax weighted-average cost of capital for water companies currently is in the range of 6½ to 7 percent, based on Dr. Vilbert's analyses.

Paradise Valley has had consistent difficulty earning its allowed rate of return on equity, which suggests problems in the regulatory process and/or other sources of risk have harmed the company. I also understand that the company is facing material capital investment requirements to comply with new arsenic standards, which ultimately will increase costs without expanding the customer base. Such investments can also increase the risk rate-regulated companies face.

Nonetheless, I do not see a need to recommend a different cost of capital for Paradise Valley than for the industry generally. A 6½ to 7 percent after-tax weighted-average cost of capital implies a cost of equity range of 12 to 13 percent at Paradise Valley's equity ratio. The best point-estimate is the middle of the range, 12.5 percent.

Q61. Are you aware that Paradise Valley is asking for a 12 percent allowed rate of return on equity, not 12.5 percent?

A61. Yes, that is my understanding.

Q62. Does that give you pause about whether your analysis is correct?

A62. No. Although the company is the best evidence on why it is making the request it does, my understanding is that there is some concern that the Commission would have difficulty accepting too high a requested return on equity. I lack the knowledge to assess the Commission's reaction to a higher requested return on equity. My analysis focuses solely on the economic principles and evidence, quite apart from considerations such as the Commission's reaction to it, and I stand by it.

However, if the Commission were concerned purely about the size of the return on equity number, I would respectfully urge it to put such concerns aside in reaching its decision for

Paradise Valley. Figure 4 (at the outset of my testimony) shows just how modest even a 12.5 percent return on equity at Paradise Valley's capital structure is, relative to the allowed rates of return on equity the Commission has recently granted to other water companies with far more equity. Figure 5 shows that the cost to Paradise Valley's customers (per $100 of rate base) of a 12.5 percent return on equity at a 36.7 percent equity ratio is materially lower than the cost implied by five of the six most recent Commission water company decisions. Additionally, Paradise Valley has a history of not earning its allowed rate of return on equity on average, and I understand that it needs material new capital investment. In such circumstances, the principles described in Sections II and III of my testimony imply Paradise Valley's customers would be harmed, and possibly materially harmed, by a decision to reduce Paradise Valley's allowed rate of return on equity merely because it looked to be higher than others recently granted. This would be particularly unfortunate, since, in reality, Paradise Valley's requested 12 percent on equity corresponds to a very modest cost to customers, relative to those in recent Commission decisions.

Q63. Does this conclude your direct testimony?

A63. Yes, it does.

Appendix A: QUALIFICATIONS OF A. LAWRENCE KOLBE

Lawrence Kolbe is a Principal of The Brattle Group ("Brattle"), an economic, environmental and management consulting firm with offices in Cambridge (Massachusetts), Washington, London, and San Francisco. Before co-founding The Brattle Group, he was a Director of Putnam, Hayes & Bartlett, and before that, he was a Vice President of Charles River Associates ("CRA"). Earlier, he was an Air Force officer assigned to the Office of the Secretary of Defense with the job title "Health Economist," and before that, he was assigned to Headquarters, USAF with the job title "Systems Analyst."

His work has included extensive research in financial economics, especially as it applies to rate regulation, project or asset valuation, and the decisions of private firms. Clients for this work include the California Public Utilities Commission, the Consumer Advocate in a Newfoundland proceeding, the Edison Electric Institute, the Electric Power Research Institute, the Interstate Natural Gas Association of America, the Newfoundland Federation of Municipalities, the Nova Scotia Board of Commissioners of Public Utilities, the Town of Labrador City, the U.S. Department of Energy, the U.S. Department of Justice, the U.S. Department of State, and a number of private firms.

He is the coauthor of three books and he has published a number of articles. He is coauthor of a report filed with the British Office of Fair Trading, in London, and he has been an expert witness in: proceedings before the U.S.-U.K. Arbitration Concerning Heathrow Airport Landing Charges (under the auspices of the International Bureau of the Permanent Court of Arbitration) in The Hague, the Iran-United States Claims Tribunal in The Hague, the U.S. Court of Federal Claims, U.S. District Courts in Arizona, Colorado, Florida, New Jersey, Oklahoma, Pennsylvania, Texas and Virginia, the Supreme Court of the State of New Mexico, Colorado District Court, a commercial arbitration tribunal in Australia, a commercial arbitration tribunal held in London concerning a dispute in Australia, the Minerals Management Service of the U.S. Department of the Interior, the Master Settlement Agreement Tobacco Arbitration Panels for the State of Louisiana and the Commonwealth of Massachusetts (which determined fee awards to private counsel assisting the state), and a commercial arbitration in Arizona; federal regulatory proceedings before the Canadian Radio-television and Telecommunications Commission, the [Canadian] National Energy Board, the [U.S.] Postal Rate Commission, the [U.S.] Surface Transportation Board, the U.S. Federal Communications Commission, the U.S. Federal Energy Regulatory Commission and the U.S. Federal Maritime Commission; and state or provincial regulatory proceedings in Alaska, Alberta, Arkansas, California, Connecticut, Illinois, Maine, Massachusetts, Michigan, Montana, Newfoundland, New Mexico, New York, Nova Scotia, Ohio, Virginia and West Virginia.

He holds a B.S. in International Affairs (Economics) from the U.S. Air Force Academy and a Ph.D. in Economics from the Massachusetts Institute of Technology. Additional information on his qualifications follows.

HONORS AND AWARDS

Sears Foundation National Merit Scholarship, 1963 (declined).
Fairchild Award, U.S. Air Force Academy, 1968 (for standing first in his class, academically).
National Science Foundation Graduate Fellowship in economics, MIT, 1968-1971.
Joint Service Commendation Medal, 1975.

PROFESSIONAL AFFILIATIONS

American Economic Association
American Finance Association
The Econometric Society
Served as Referee for *The Rand Journal of Economics*, *Land Economics*, *The Journal of Industrial Economics*

AVAILABLE PAPERS AND PUBLICATIONS

"The Effect of Debt on the Cost of Equity in a Regulatory Setting," (with Michael J. Vilbert and Bente Villadsen, and with "The Brattle Group" listed as author), published by the Edison Electric Institute (dated January 2005, issued April 2005)

Capital Investment and Valuation, (with Richard A. Brealey and Stewart C. Myers, with "The Brattle Group" listed as third author), New York: McGraw-Hill/Irwin (2003).

"The True Hourly Rate for Private Counsel in the State of Louisiana Tobacco Lawsuit," (with August J. Baker and Bin Zhou), Brattle report prepared for private counsel to the Louisiana Attorney General in the state's lawsuit to recover health care costs from the tobacco industry (July 2000).

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Appendix B: EFFECTS OF DEBT ON THE COST OF EQUITY

Q1. What is the purpose of this appendix?

A1. The body of my testimony illustrates why the use of additional debt increases equity's risk at an ever-increasing rate. This appendix provides additional detail on how debt affects the cost of equity. It first expands the example used in the body of my testimony. Then it illustrates the implications of a large body of financial research. It provides a summary of that research at the end.

I. EXPANDED EXAMPLE

Q2. The mortgage example in your testimony did not address rent, interest expense or taxes. Please do so now.

A2. Okay. Let's start with rent and interest expense, and leave taxes until the next part of the appendix. Rent could affect a dwelling buyer in two ways. First, the buyer could buy the dwelling as an investment or as a future retirement home and rent it out. Second, the dwelling buyer could live there and avoid having to pay rent on an apartment instead. The former seems to be the better analogy for present purposes.

Assume rent on the $100,000 dwelling would net the owner $500 per month on average after all (non-interest) expenses, or $6,000 annually. Suppose also that expected appreciation in housing prices were 4 percent, so its expected value would be $104,000 after the first year. Then the expected rate of return from owning the dwelling if there is no mortgage would be:

$$\text{Expected rate of return @ 0\% Mortgage} = \frac{\text{Expected Net Rent + Expected Value Appreciation}}{\text{Initial } \textit{Dwelling} \text{ Value}}$$

$$= \frac{\$6{,}000 + (\$104{,}000 - \$100{,}000)}{\$100{,}000}$$

$$= \frac{\$6{,}000 + \$4{,}000}{\$100{,}000} = \frac{\$10{,}000}{\$100{,}000}$$

$$= 10\%$$

Suppose also that the mortgage interest rate were 6 percent. Then at a mortgage equal to 50 percent of the purchase price, or \$50,000, interest expense would be (\$50,000 x 0.06), or \$3,000. The expected equity rate of return would be

$$\text{Expected rate of return @ 50\% Mortgage} = \frac{\text{Expected (Net Rent + Value Appreciation) - Interest}}{\text{Initial } \textit{Equity} \text{ Value}}$$

$$= \frac{\$6{,}000 + (\$104{,}000 - \$100{,}000) - \$3000}{\$50{,}000}$$

$$= \frac{\$6{,}000 + \$4{,}000 - \$3{,}000}{\$50{,}000} = \frac{\$7{,}000}{\$50{,}000}$$

$$= 14\%$$

The expected return on equity is higher. However, as illustrated in the figures in my testimony, so is the risk equity bears.

Q3. Can you provide a more general illustration?

A3. Yes. Figure B-1 uses these assumptions at different mortgage levels to plot both (1) the expected rate of return on the equity in the dwelling, and (2) the realized rate of return on that equity in a year if the dwelling value increases by 10 percent more than the expected 4 percent rate (i.e., if the dwelling value increases by 14 percent) or by 10 percent less than expected (i.e., if it decreases by 6 percent).[1]

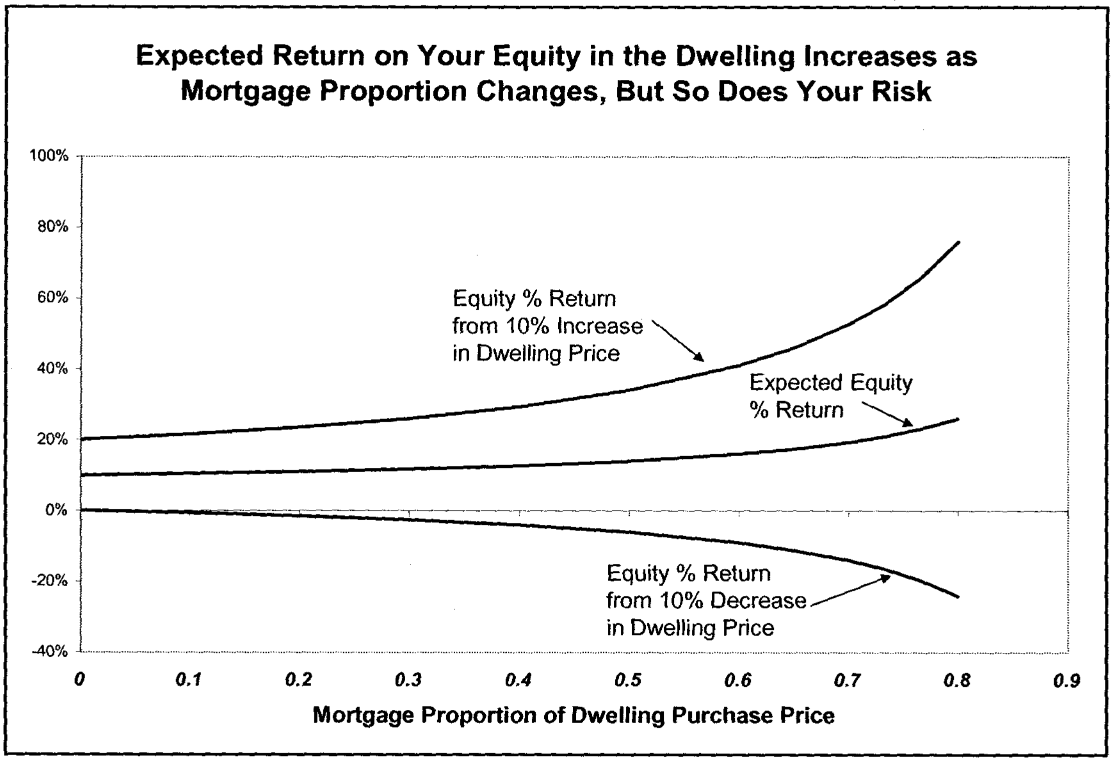

Figure B-1

The expected rate of return on equity increases at an increasing rate as the buyer finances more and more of the dwelling with a mortgage. But since (absent financial distress or bankruptcy) equity bears all of the risk of fluctuations in dwelling values, the amount of risk the

[1] For simplicity, the figure assumes the mortgage interest rate is independent of the mortgage proportion. This might not always be true, and in general would not be true for a corporation that issued debt. However, the same basic picture would emerge if the interest rate varied in a realistic way as the mortgage proportion increased.

buyer bears grows at an ever increasing rate at the mortgage percentage increases, too. (The upper and lower lines in Figure B-1 effectively just add the lines from Figure 10 to the Figure B-1 expected rate of return on equity.) This means the required rate of return on equity must increase, else the buyer would be bearing risk without reward.

Q4. Can you provide an example of a deal that would involve bearing financial risk with no reward?

A4. Suppose someone were to object that they don't think of the equity in their home as requiring a higher expected rate of return just because they use a mortgage, and that they personally would not demand a higher rate of return for this risk. Suppose also that the numbers in the dwelling example above were in front of this person and a potential co-investor in a dwelling. The co-investor would be happy to propose a deal something like the following.

"Why don't we buy the dwelling 50-50. It costs \$100,000. We'll finance it 50 percent with a mortgage, so we each put in \$25,000 in equity and are individually responsible for \$25,000 of the mortgage. We'll rent the dwelling out, sell it in one year, and pay off the mortgage. I say we have a 14 percent required return on equity, or an expected \$3,500 each on our \$25,000 individual equity investments. But you only require 10 percent, the overall expected rate of return on the dwelling itself, because you don't think use of a mortgage increases your required return on equity. That means you'll be satisfied with an expected return of \$2,500. It's easy for us to achieve that outcome: whatever the result of our investment, I'll just pocket an extra \$1,000 from your half of the investment as part of my share. You're happy, because you get the 10 percent expected rate of return you require, and so am I, because I earn a superior risk-adjusted rate of return, 18 percent instead of the market 14 percent. In fact, I'd even be willing to split the difference and take only $500 instead of $1,000 from your half. That would give us both a higher expected return than we require, you 12 percent ($3,000/$25,000) and me 16 percent ($4,000/$25,000). It's win-win, given your return requirements. After we cash out the first year's dwelling, let's do it again, but with more money next time."

Anyone willing to bear financial risk without reward can expect many such offers. Anyone who asks someone else to bear financial risk without reward will find few if any takers. That is why the more debt a company adds, the higher its cost of equity.

Q5. Are mortgages the only everyday example of the effect of debt on the risk of equity?

A5. No, any time someone uses debt to finance part an investment, the same risk magnification occurs. For example, if you buy stocks "on margin" -- by borrowing part of the money you use to buy them -- you have a higher expected rate of return, but more risk. You could illustrate this by attaching new labels to Figures 8 and 9 in the body of my testimony, say, so the "dwelling" became your stock portfolio and the "mortgage" became your margin debt. Of course, stocks are a lot more volatile than dwellings, in normal circumstances, so you'd be hard pressed to use 80 percent margin to buy stocks unless you offered additional security. If you did buy on margin, you'd have a higher expected rate of return, as in Figure B-1 (again, with the labels changed), but you'd be bearing a lot more risk, too. Imagine investing your retirement savings in a stock portfolio bought with as much margin as possible. If you were lucky, you could end up living very well in retirement. But you'd be taking a lot of risk of the opposite outcome, since your portfolio could decline by more than 100 percent of your initial investment.

The point is, exactly the same risk-magnifying effects happen when companies borrow to finance part of their investments.

II. TAXES AND OTHER EFFECTS OF DEBT

Q6. What about taxes, which you skipped in Figure B-1?

A6. Analysis of the net effect of taxes in capital structure decisions by corporations is an important part of the financial research. (Other parts of that research address such issues as the risk of financial distress or bankruptcy, and the signals corporations send investors by the choice of how to finance new investments.) The bottom line is that taxes complicate the picture without changing the basic conclusion.

Q7. Nonetheless, please describe the potential impact of taxes. Start with why taxes may affect the appropriate capital structure.

A7. Interest expense is tax-deductible for corporations. That increases the pool of cash the corporation gets to keep out of its operating earnings (i.e., its earnings before interest expense). With no debt, 100 percent of operating income is subject to taxes. With debt, only the equity part of the operating income is subject to taxes.

All else equal, the extra money kept from operating income increases the value of the corporation. The standard way to recognize that increase in value is to use an after-tax weighted-average cost of capital as a discount rate when valuing a company's operating cash flows.[2]

Q8. Do personal taxes affect the value of debt, too?

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[2] As noted in the body of my testimony and discussed in more detail below, the textbook after-tax weighted-average cost of capital used for this purpose equals the *market*-value weighted average of the cost of equity and the *after-tax*, *current* cost of debt.

A8. Yes, but in the other direction. One offset to debt's tax benefits at the corporate level is its higher tax burden at the personal level. Investors care about the money they get to keep after all taxes are paid, and while the corporation saves taxes by opting for debt over equity, individuals pay more taxes on interest than on capital gains from equity (and for now, on dividends as well).

Q9. Does anything else (i.e., other than taxes) matter?

A9. Absolutely. "All else" does not remain equal as more debt is added. The more debt, the more the non-tax effects of debt offset the tax benefits. Other costs include such effects as a loss of flexibility, the possibility of sending negative signals to investors, and a host of costs and risks associated with the danger of financial distress.

Q10. Does the tradeoff between the tax and non-tax effects of debt mean that firms have well-defined, optimal capital structures?

A10. No, this sort of "tradeoff" model does not explain actual corporate behavior. A substantial body of economic research confirms that real-world corporations act as if, after a moderate amount of debt is in place, the tax benefits of debt are not worth debt's other costs. In country after country and in industry after industry, the most profitable corporations in an industry tend to use the least debt. The research on this point is quite thorough, and the finding that the most profitable companies tend to use the least debt in a given industry is robust. Yet these are the companies with the most operating income to shield from taxes, who would benefit most if interest tax shields were truly valuable net of debt's other costs. They also presumptively are the best-managed on average (else why are they the most profitable?).

This means it is unrealistic to suppose that more debt is always better, or that greater tax savings due to higher interest expense always add value to the firm on balance.

Q11. If the tradeoff model doesn't explain capital structure decisions by firms, is there a model that does?

A11. No, not completely. Various alternative models to the tradeoff model exist (e.g., the "pecking order" hypothesis and "agency cost" explanations), but no theory has yet emerged as "the" explanation of capital structure. That very fact, however, has important implications for the overall effect of debt on the value of the firm.

Q12. What does the absence of an agreed theory of capital structure in the financial literature imply about the overall effect of debt on the value of the firm?

A12. The findings of theoretical and empirical research mean that within an industry, there is no well-defined optimal capital structure. Use of some debt does convey some value advantage in most industries, but that advantage is offset by other costs as firms add more debt.[3] The range of capital structures over which the value of the firm in any industry is maximized is wide and should be treated as flat. The location and level of that range, however, does vary from industry to industry, just as the overall cost of capital varies from industry to industry.

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[3] Note that if debt did increase the value of the firm materially, competition would tend to take that value away, since issuing debt is an easy-to-copy competitive strategy. Prices would fall as firms copied the strategy, lowering operating earnings and passing the net tax advantages to debt through to customers (just as happens under rate regulation). Therefore, if also there were a narrow range of optimal capital structures within an industry, competition would drive all firms in the industry to capital structures within that range. This does not happen in practice, which contradicts one or both of the assumptions, i.e., (1) that debt adds material value on balance, and/or (2) that there is a narrow range of optimal capital structures.

Figure B-2 illustrates the picture that emerges from the research. This figure shows the present value of an investment in each of four different industries. For simplicity, the investment is expected to yield $1.00 per year forever. For firms in relatively high-risk industries (Industry 1 in the graph, the lowest line), the $1.00 perpetuity is not worth much and any use of debt decreases firm value. For firms in relatively low-risk industries (Industry 4 in the graph), the perpetuity is worth more and substantial amounts of debt make sense. Industries 2 and 3 are intermediate cases.

The maximum net rate at which taxes can increase value in this figure equals 20 percent of interest expense, representing a balance between the corporate tax advantage to debt and the personal tax disadvantage. The figure plots the maximum possible impact of taxes on value as a separate line, starting at the all-equity value of the lowest-risk industry (Industry 4).

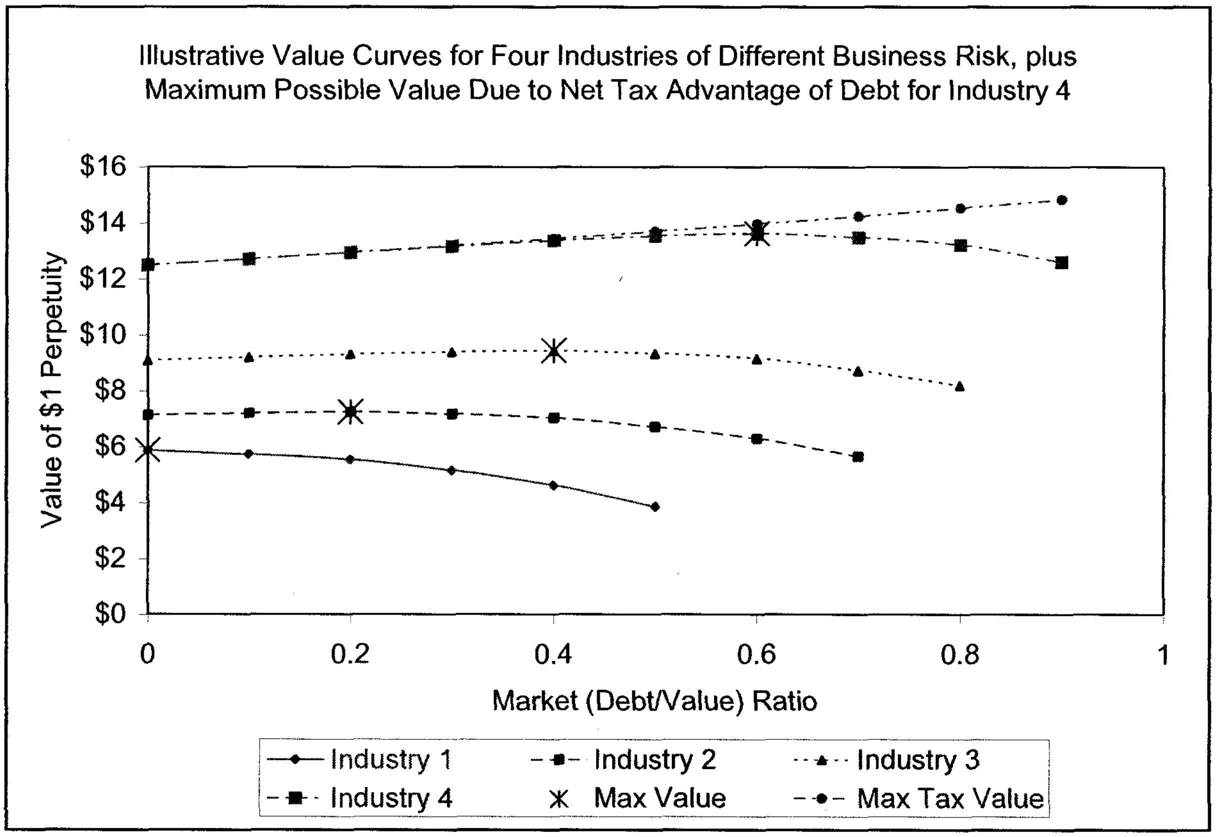

Figure B-2

Figure B-2 identifies a particular point as the maximum value on each of the four curves. However, the research shows that reliable identification of this maximum point, except in the extreme case where no debt should be used, is impossible. In accord with the research, the graph is prepared so that in none of the industries does a change in capital structure make much difference near the top of the curve. Even Industry 4, which increases in value at the maximum rate as quite a lot of debt is added, eventually must reach a broad range where changes in the debt ratio make little difference to firm value, given the research. For Industry 4, debt makes less than a 2 percent difference in the total value of the firm for debt-to-value ratios between 40 and 70 percent. (While these particular values are illustrative, numbers of this order of magnitude are the only ones consistent with the research.)

Q13. What does this imply for the overall cost of capital?

A13. Figure B-3 plots the after-tax weighted-average costs of capital ("ATWACCs") that correspond to the value curves in Figure B-2. This picture just turns Figure B-2 upside down.[4] All the same conclusions remain, except that they are stated in terms of the overall cost of capital instead of the overall firm value. In particular, except for high-risk industries, the overall cost of capital is essentially flat across a broad middle range of capital structures for each industry, which is the only outcome consistent with the research. For Industry 4, for example, the ATWACC changes by less than 15 basis points for debt-to-value ratios between 40 and 70 percent.

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4 Note that the actual estimated ATWACC at higher debt ratios will tend to underestimate the ATWACC that corresponds to the value curves in Figure B-2, which are depicted in Figure B-3, and so will tend to overestimate the value of debt to the firm. The reason is that some of the non-tax effects of excessive debt, such as a loss of financial flexibility, may be hard to detect and not show up in cost of capital measurement. Also, the value of the firm will fall at high debt ratios for reasons that can be entirely independent of the cost of capital, strictly defined. Therefore, the true ATWACC for project valuation purposes, at least at high debt ratios, is higher than the simple average of an industry sample of ATWACCs, but this refinement cannot be made with available estimation techniques. This conclusion carries over to rate regulation, too.

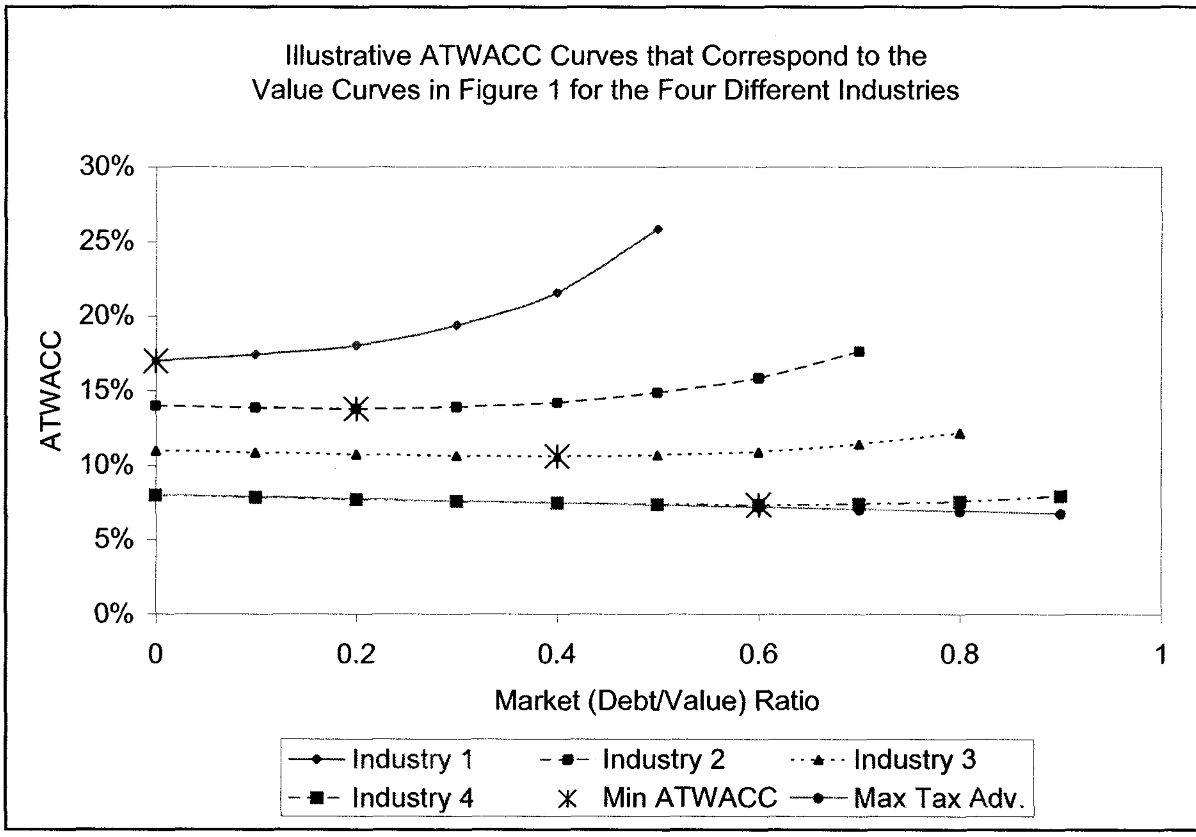

Figure B-3

Q14. How does this discussion relate to estimation of the right cost of equity for ratemaking purposes?

A14. When an analyst estimates the cost of equity for a sample of companies, s/he does so at the sample's actual market-value capital structure. That is, the sample evidence corresponds to ATWACCs that are already out somewhere in the broad middle range in which changes in the debt ratio have little or no impact on the overall value of the firm or the ATWACC.

An analyst therefore should assume the ATWACCs for the sample companies are literally flat. This assumption always provides the exact tradeoff between the cost of equity and capital structure at the literal minimum of the company's ATWACC curve. The research shows that this minimum is actually a broad, flat region, as depicted above. If the company happens to be somewhat to one side or the other of the literal minimum within this region, the recommended procedure may lead to a very small understatement or overstatement of the amount that the cost of equity will change as capital structure changes. The degree of this under- or overstatement, however, is trivial compared to the inherent uncertainty in estimating the cost of equity in the first place. Otherwise, the financial research would have found very different results about the existence of a narrowly defined optimal capital structure.

Q15. Can you provide an overview of this research?

A15. Yes, but I must caution that there are certainly dozens, and perhaps hundreds of scholarly papers on this topic. The next section describes key historical papers in the literature and a good sampling of relevant recent research, but I cannot and do not claim it is comprehensive.

III. AN OVERVIEW OF THE ECONOMIC LITERATURE

Q16. What is the focus of the economic literature on the effects of debt?

A16. The economic literature focuses on the effects of debt on the value of a firm. The standard way to recognize one of these effects, the impact of the fact that interest expense is tax-deductible, is to discount the all-equity after-tax operating cash flows generated by a firm or an investment project at a weighted average cost of capital, typically known in textbooks as the "WACC." The textbook WACC equals the *market*-value weighted average of the cost of equity and the *after-tax*, *current* cost of debt. However, rate regulation in North America has a legacy of working with another weighted-average cost of capital, the *book*-value weighted average of the cost of equity and the *before-tax*, *embedded* cost of debt. Accordingly, in regulatory settings it's useful to refer to the textbook WACC as the "ATWACC," or after-tax weighted-average cost of capital. I follow that practice here.

Q17. What is the implication of the literature's focus in the present context?

A17. Since the literature focuses on the overall effect of debt on the value of the firm, a discussion summarizing that literature must do so, also. The principal goal of the appendix is to translate the literature's findings on debt's effects on firm value into procedures to adjust the cost of equity for capital structure changes.

Q18. How is this section of the appendix organized?

A18. It starts with the tax effects of debt. It then turns to other effects of debt.

A. TAX EFFECTS

Q19. What are the main threads of the literature on the tax effects of debt?

A19. Three seminal papers define the main threads of this literature. The first assumes no taxes and risk-free debt. The second adds corporate income taxes. The third adds personal income taxes.

1. Base Case: No Taxes, No Risk to High Debt Ratios

Q20. Please start by explaining the simplest case of the effect of debt on the value of a firm.

A20. The "base case," no taxes and no costs to excessive debt, was worked out in a classic 1958 paper by Franco Modigliani and Merton Miller, two economists who eventually won Nobel Prizes in part for their body of work on the effects of debt.[5] Their 1958 paper made what is in retrospect a very simple point: if there are no taxes and no risk to the use of excessive debt, use of debt will have no effect on a company's operating cash flows (i.e., the cash flows to investors as a group, debt plus equity combined). If the operating cash flows are the same regardless of whether the company finances mostly with debt or mostly with equity, the value of the firm cannot be affected at all by the debt ratio. In cost of capital terms, this means the overall cost of capital is constant regardless of the debt ratio, too.

In this case, issuing debt merely divides the same set of cash flows into two pools, one for bondholders and one for shareholders. If the divided pools have different priorities in claims on the cash flows, the risks and costs of capital will differ for each pool. But the risk and overall cost of capital of the entire firm, the sum of the two pools, is constant regardless of the debt ratio. That means,

$$r^*_1 = r_{A1} \qquad \text{(B-1a)}$$

where r^*_1 is the overall after-tax cost of capital at any particular capital structure and r_{A1} is the all-equity cost of capital for the firm. (The "1" subscripts distinguish these quantities in the case

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[5] Franco Modigliani and Merton H. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment," *American Economic Review*, 48: 261-297 (June 1958).

where there are no taxes from subsequent equations that consider first corporate and then both corporate and personal taxes.) With no taxes and no risk to debt, the overall cost of capital does not change with capital structure.

This implies that the right formula to relate the overall cost of capital to the component costs of debt and equity is

$$r_{E1} \times (E/V) + r_D \times (D/V) = r^*_1 \qquad \text{(B-1b)}$$

with the overall cost of capital (r^*) on the *right* side, as the *independent* variable, and the costs of equity (r_E) and debt (r_D) on the left side, as *dependent* variables determined by the overall cost of capital and by the capital structure (i.e., the shares of equity (E) and debt (D) in overall firm value (V=E+D)) that the firm happens to choose. Note that if equation (B-1a) were correct, the equation that solved it for the cost of equity would be,

$$r_{E1} = r^*_1 + (r^*_1 - r_D) \times (D/E) \qquad \text{(B-1c)}$$

Note also that (D/E) gets exponentially higher in this equation as the debt-to-value ratio increases.[6] Therefore Equation (B-1c) has the property emphasized in the body of my evidence, that the cost of equity grows at an ever-increasing rate as you add more and more debt.

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[6] For example, at 20-80, 50-50, and 80-20 debt-equity ratios, (D/E) equals, respectively, (20/80) = 0.25, (50/50) = 1.0, and (80/20) = 4.0. The extra 30 percent of debt going from 20-80 to 50-50 has much less impact on (D/E) [i.e., by moving it from 0.25 to 1.0] than the extra 30 percent of debt going from 50-50 to 80-20 [i.e., by moving it from 1.0 to 4.0]. Since the cost of equity equals a constant risk premium times the debt-equity ratio, the cost of equity grows ever more rapidly as you add more and more debt.

2. Corporate Tax Deduction for Interest Expense

Q21. What happens when you add corporate taxes to the discussion?

A21. If corporate taxes exist with risk-free debt (and if only taxes at the corporate level matter, not taxes at the level of the investor's personal tax return), the initial conclusion changes. Debt at the corporate level reduces the company's tax liability by an amount equal to the marginal tax rate times interest expense. All else equal, this will add value to the company because more of the operating cash flows will end up in the hands of investors as a group. That is, if only corporate taxes mattered, interest would add cash to the firm equal to the corporate tax rate times the interest expense. This increase in cash would increase the value of the firm, all else equal. In cost of capital terms, it would reduce the overall cost of capital.

How much the value of the firm would rise and *how far* the overall cost of capital would fall would depend in part on how often the company adjusts its capital structure, but this is a second-order effect in practice. (The biggest effect would be if companies could issue riskless perpetual debt, an assumption Profs. Modigliani and Miller explored in 1963, in the second seminal paper;[7] this assumption could *not* be true for a real company.) Prof. Robert A. Taggart provides a unified treatment of the main papers in this literature and shows how various cases relate to one another.[8] Perhaps the most useful set of benchmark equations for the case where only corporate taxes matter are:

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7 Franco Modigliani and Merton H. Miller, "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review*, 53: 433-443 (June 1963).

8 Robert A. Taggart, Jr., "Consistent Valuation and Cost of Capital Expressions with Corporate and Personal Taxes," *Financial Management* 20: 8-20 (Autumn 1991)

$$r^*_2 = r_{A2} - r_D \times t_C \times (D/V) \quad \text{(B-2a)}$$

$$r_{E2} \times (E/V) + r_D \times (D/V) \times (1 - t_C) = r^*_2 \quad \text{(B-2b)}$$

which imply for the cost of equity,

$$r_{E2} = r_{A2} + (r_{A2} - r_D) \times (D/E) \quad \text{(B-2c)}$$

where the variables have the same meaning as before but the "2" subscripts indicate the case that considers corporate but not personal taxes.

Note that Equation (B-2a) implies that when only corporate taxes matter, the overall after-tax cost of capital declines steadily as more debt is added, until it reaches a minimum at 100 percent debt (i.e., when D/V = 1.0). Note also that Equation (B-2c) still implies an exponentially increasing cost of equity as more and more debt is added. In fact, except for the subscript, Equation (B-2c) looks just like Equation (B-1c).

However, whether any value is added and whether the cost of capital changes at all also depends on the effect of taxes at the personal level.

3. Personal Tax Burden on Interest Expense

Q22. How do personal taxes affect the results?

A22. Ultimately, the purpose of investment is to provide income for consumption, so personal taxes affect investment returns. For example, in the U.S., municipal bonds have lower interest rates than corporate bonds because their income is taxed less heavily at the personal level. In general, capital appreciation on common stocks is taxed less heavily than interest on corporate bonds because (1) taxes on unrealized capital gains are deferred until the gains are realized, and (2) the capital gains tax rate is lower. Dividends are taxed less heavily than interest, also, under current tax law.[9] The effects of personal taxes on the cost of common equity are hard to measure, however, because common equity is so risky.

Professor Miller, in his Presidential Address to the American Finance Association,[10] explored the issue of how personal taxes affect the overall cost of capital. The paper pointed out that personal tax effects could offset the effect of corporate taxes entirely.

Q23. Is it likely that the effect of personal taxes will completely neutralize the effect of corporate taxes?

A23. I do not believe so, although the likelihood of such a result would be increased if the current federal tax reductions on dividends and capital gains became permanent rather than expiring in 2008. However, personal taxes are important even if they do not make the corporate tax advantage on interest vanish entirely. Capital gains and dividend tax advantages definitely convey some personal tax advantage to equity, and even a partial personal advantage to equity reduces the corporate advantage to debt.

The Taggart paper explores the case of a partial offset, also. With personal taxes, the risk-free rate on the security market line is the after-personal-tax rate, which must be equal for risk-free debt and risk-free equity.[11] Therefore, the pre-personal-tax risk-free rate for equity will generally

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9 This provision is set to expire at the end of 2008.

10 Merton H. Miller, "Debt and Taxes," *The Journal of Finance*, 32: 261-276 (May 1977), the third of the seminal papers mentioned earlier.

11 As Prof. Taggart notes (his footnote 9), it is not necessary that a specific, risk-free equity security exist as long as one can be created synthetically, through a combination of long and short sales of traded assets. Such constructs are a common analytical tool in financial economics.

not be equal to the pre-personal-tax risk-free rate for debt. In particular, $r_{fE} = r_{fD} \times [(1-t_D)/(1-t_E)]$, where r_{fE} and r_{fD} are the risk-free costs of equity and debt and t_E and t_D are the personal tax rates for equity and debt, respectively. In terms of the cost of debt, the Taggart paper's results imply that a formal statement of these effects can be written as:[12]

$$r^*_3 = r_{A3} - r_D \times t_N \times (D/V) \qquad \text{(B-3a)}$$

$$r_{E3} \times (E/V) + r_D \times (D/V) \times (1-t_C) = r^*_3 \qquad \text{(B-3b)}$$

which imply

$$r_{E3} = r_{A3} + \{r_{A3} - r_D \times [(1-t_D)/(1-t_E)]\} \times (D/E) \qquad \text{(B-3c)}$$

Suppose, for example, that $t_C = 0.35$ percent, $t_E = 7.7$ percent and $t_D = 40$ percent. Then $[(1-t_D)/(1-t_E)] = 0.65 = (1-t_C)$. That condition corresponds to Miller's 1977 paper, in which the net personal tax advantage of equity fully offsets the net corporate tax advantage of debt. Note also that in that case, $t_N = 0$.[13] Therefore, if the personal tax advantage on equity fully offsets the corporate tax advantage on debt, Equation (B-3a) confirms that the overall after-tax cost of capital is a constant.

However, I believe it is unlikely that the personal tax advantage of equity fully offsets the corporate tax advantage of debt. If not, and if taxes were all that mattered (i.e., if there were no other costs to debt), the overall after-corporate-tax cost of capital would still fall as debt was added, just not as fast. How fast it falls would depend chiefly on the net corporate-over-personal

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[12] The net all-tax effect of debt on the overall cost of capital, t_N, equals $\{[t_C+t_E-t_D-(t_C \times t_E)] / (1-t_E)\}$, where t_D is the personal tax rate on debt, as before. This measure of net tax effect is designed for use with the cost of debt in Equation (B-3a), which seems more useful in the present context. The Taggart paper works with a similar measure, but one which is designed for use with the cost of risk-free equity in the equivalent Taggart equation.

[13] In the above example, $t_N = \{[0.35+0.077-0.4-(0.35 \times 0.077)] / (1.0-0.077)\} = 0.0/0.963 = 0$.

tax advantage of debt (and secondarily on how often the company readjusts its capital structure to the "normal" or "target" level). Even absent a complete offset, personal tax effects still serve to reduce the corporate tax advantage of debt.

Finally, note that the overall after-tax cost of capital, Equation (B-3b), still uses the corporate tax rate even when personal taxes matter. Equations (B-2b) and (B-3b) both correspond to the usual formula for the ATWACC. Personal taxes affect the way the cost of equity changes with capital structure -- Equation (B-3c) -- but not the formula for the overall after-tax cost of capital given that cost of equity.

B. NON-TAX EFFECTS

Q24. Please describe the non-tax effects of debt.

A24. If debt is truly valuable, firms should use as much as possible, and competition should drive firms in a particular industry to the same, optimal capital structure for the industry. If debt is harmful on balance, firms should avoid it. Neither picture corresponds to what we actually see. A large economic literature has evolved to try to explain why.

Part of the answer clearly are the costs of excessive debt. Here the results cannot be reduced to equations, but they are no less real for that fact. As companies add too much debt, the costs come to outweigh the benefits. Too much debt reduces or eliminates financial flexibility, which cuts the firm's ability to take advantage of unexpected opportunities or weather unexpected difficulty. Use of debt rather than internal financing may be taken as a negative signal by the market.

Also, even if the company is generally healthy, more debt increases the risk that a bad year will imply the company cannot use all of the interest tax shields when anticipated. As debt continues to grow, this problem grows worse and others crop up. Managers begin to worry about meeting debt payments instead of making good operating decisions. Suppliers are less willing to extend trade credit, and a liquidity shortage can translate into lower operating profits. Ultimately, the firm might have to go through the costs of bankruptcy and reorganization. Collectively, such factors are known as the costs of "financial distress."[14]

The net tax advantage to debt, if positive, is affected by costs such as a growing risk that the firm might have to bear the costs of financial distress. First, the expected present value of these costs offsets the value added by the interest tax shield. Second, since the likelihood of financial distress is greater in bad times when other investments also do poorly, the possibility of financial distress will increase the risks investors bear. These effects increase the variability of the value of the firm. Thus, firms that use too much debt can end up with a higher overall cost of capital than those that use none.

Other parts of the answer include the signals companies send to investors by the decision to issue new securities, and by the type of securities they issue. Other threads of the literature explore cases where management acts against shareholder interests, or where management attempts to "time" the market by issuing specific securities under different conditions. For present purposes, the important point is that no theory, whether based on taxes or on some completely different issue, has emerged as "the" explanation for capital structure decisions by firms.

[14] See, for example, Richard A. Brealey and Stewart C. Myers, *Principles of Corporate Finance*, 7th Ed., New York: Irwin McGraw-Hill (2003) at 497-508.

Nonetheless, despite the lack of a single "best" theory, there is a great deal of relevant empirical research.

Q25. What does that research show?

A25. The research does not support the view that debt makes a material difference in the value of the firm, at least not once a modest amount of debt is in place. If debt were truly valuable, competitive firms should use as much as possible without producing financial distress, and competitive firms that use less debt ought to be less profitable. The research shows exactly the opposite.

For example, Kestler[15] found that firms in the same industry in both the U.S. and Japan do not band around a single, "optimal" capital structure, and the most profitable firms are the ones that use the *least* debt. This finding comes despite the fact that both countries at the time (unlike the U.S. currently) had fully "classical" tax systems, in which dividends are taxed fully at both the corporate and personal level. Wald[16] confirms that high profitability implies low debt ratios in France, Germany, Japan, the U.K., and the U.S. Booth *et al.* find the same result for a sample of developing nations.[17] Fama and French[18] analyze over 2000 firms for 28 years (1965-1992,

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[15] Carl Kester, "Capital and Ownership Structure: A Comparison of United States and Japanese Manufacturing Concerns," *Financial Management*, 15:5-16, (Spring, 1986).

[16] John K. Wald, "How Firm Characteristics Affect Capital Structure: An International Comparison," *Journal of Financial Research*, 22:161-167 (Summer 1999).

[17] Laurence Booth *et al.*, "Capital Structures in Developing Countries," *The Journal of Finance* Vol. LVI (February 2001), pp. 87-130, finds at p. 105 that "[o]verall, the strongest result is that profitable firms use less total debt. The strength of this result is striking ..."

[18] Eugene F. Fama and Kenneth R. French, "Taxes, Financing Decisions and Firm Value," *The Journal of Finance*, 53:819-843 (June 1998).

inclusive) and conclude, "Our tests thus produce no indication that debt has net tax benefits."[19] A recent paper by Graham[20] carefully analyzes the factors that might have led a firm not to take advantage of debt. It confirms that a large proportion of firms that ought to benefit substantially from use of additional debt, including large, profitable, liquid firms, appear not to use it "enough."

This research leaves us with only three options: either (1) apparently good, profit-generating managers are making major mistakes or deliberately acting against shareholder interests, (2) the benefits of the tax deduction on debt are less than they appear, or (3) the non-tax costs to use of debt offset the potential tax benefits. Only the first of these possibilities is consistent with the view that the tax deductibility of debt conveys a material cost advantage. Moreover, if the first explanation were interpreted to mean that otherwise good managers are acting against shareholder interests, either deliberately or by mistake, it would require the additional assumption that their competitors (and potential acquirers) let them get away with it.

Q26. Are there any explanations in the financial literature for this puzzle other than stupid or self-serving managers at the most profitable firms?

A26. Yes. For example, Stewart C. Myers, a leading expert on capital structure, made it the topic of his Presidential Address to the American Finance Association.[21] The poor performance of tax-based explanations for capital structure led him to propose an entirely different mechanism, the "pecking

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[19] *Ibid.*, p. 841.

[20] John R. Graham, "How Big Are the Tax Benefits of Debt," *The Journal of Finance*, 55:1901-1942 (October 2000)

[21] Stewart C. Myers, "The Capital Structure Puzzle," *The Journal of Finance*, 39: 575-592 (1984). See also S. C. Myers and N. S. Majluf, "Corporate Financing Decisions When Firms Have Information Investors Do Not Have," *Journal of Financial Economics* 13:187-222 (June 1984).

order" hypothesis. This hypothesis holds that the net tax benefits of debt (i.e., corporate tax advantage over personal tax disadvantage) are at most of a second order of importance relative to other factors that drive actual debt decisions.[22] Similarly, Baker and Wurgler (2002)[23] observe a strong and persistent impact that fluctuations in market value have on capital structure. They argue that this impact is not consistent with other theories. The authors suggest a new capital structure theory based on market timing -- capital structure is the cumulative outcome of attempts to time the equity market.[24] In this theory, there is no optimal capital structure, so market timing financing decisions just accumulate over time into the capital structure outcome. (Of course, this theory only makes sense if investors do not recognize what managers are doing.)

Q27. Do inter-firm differences within an industry explain the wide variations in capital structure across the firms in an industry?

A27. No. Any such view is flatly contradicted by the empirical research. As already noted, it has long been found that the most profitable firms in an industry, i.e., those in the best position to take advantage of debt, use the least.[25] The recent Graham paper very carefully examines differences in firm characteristics as possible explanations for why firms use "too little" debt and concludes that such differences are *not* the explanation: firms that ought to benefit substantially from more

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[22] See also Stewart C. Myers, "Still Searching for Optimal Capital Structure," *Are the Distinctions Between Debt and Equity Disappearing?,* R.W. Kopke and E. S. Rosengren, eds., Federal Reserve Bank of Boston. (1989).

[23] Malcolm Baker and Jeffrey Wurgler, "Market Timing and Capital Structure," *The Journal of Finance* 57:1-32 (2002).

[24] *Ibid.*, p. 29.

[25] For example, Kestler, *op. cit.* and Wald, *op. cit.*

debt by all measurable criteria, if the net tax advantage of debt is truly valuable, voluntarily do not use it.[26]

Nor does the research support the view that firms are constantly trying to adjust their capital structures to optimal levels. Additional research on the pecking order hypothesis demonstrates that firms do not tend towards a target capital structure, or at least do not do so with any regularity, and that past studies that seemed to show the contrary actually lacked the power to distinguish whether the hypothesis was true or not.[27] In the words of the Shyam-Sunder - Myers paper (at p. 242), "If our sample companies did have well-defined optimal debt ratios, it seems that their managers were not much interested in getting there."[28]

C. COMBINED EFFECTS

Q28. Please summarize the implications of the literature for the combined impact of the tax and non-tax effects of debt.

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[26] While not contradicting Graham's finding that differences in firm characteristics do not explain capital structure differences, Nengjiu Ju, Robert Parrino, Allen M. Poteshman, and Michael S. Weisbach, "Horses and Rabbits? Optimal Dynamic Capital Structure from Shareholder and Manager Perspectives," Working Paper, December 27, 2003 (forthcoming in the *Journal of Financial and Quantitative Analysis*), looks at the issue in another way. This paper uses a dynamic rather than static model to analyze the tradeoff between the tax benefits of debt and the risk of financial distress. It finds that bankruptcy costs by themselves are enough to explain observed capital structures, once dynamic effects are considered. This simply means debt is not as valuable as the traditional static analysis, of the sort used by Graham and many others, implies.

[27] Lakshmi Shyam-Sunder and Stewart C. Myers, "Testing static tradeoff against pecking order models of capital structure," *Journal of Financial Economics* 51:219-244 (February 1999).

[28] See also the Winter 1995 issue of the *Journal of Applied Corporate Finance* 7, No. 4, which has a series of articles on what might explain capital structure, given that the static tradeoff approach does not.

A28. The above results are not just *theory*, they are empirical *fact*. The most profitable firms do not behave as if the precise amount of debt they use makes any material difference to value, and competition does not force them into an alternative decision, as it would if debt were genuinely valuable. The explanation that fits the facts and the research is that within an industry, there is no well-defined optimal capital structure. Use of some debt does convey an advantage in most industries, but that advantage is offset by other costs as firms add more debt. The range of capital structures over which the value of the firm in any industry is maximized is wide and should be treated as flat. The location and level of that range, however, does vary from industry to industry, just as the overall cost of capital varies from industry to industry. To conclude that more debt does add more value, once the firm is somewhere in the normal range for the industry, is to conclude that corporate management in general is either blind to an easy source of value or otherwise incompetent (and that their competitors let them get away with it).

The finding that there is no narrowly defined optimal capital structure implies that analysts should estimate the ATWACCs for a sample of companies in a given industry and treat the average ATWACC value as independent of capital structure. The right cost of equity for a rate-regulated company in the same industry is the number that yields the same ATWACC at the capital structure used to set the revenue requirement, since that is the cost of equity that (estimation problems aside) the sample companies would have had if their market-value capital structures had been equal to the regulatory capital structure.

Q29. Does this complete Appendix B?

A29. Yes, it does.

VILBERT

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT.	DOCKET NO. W-01303A-05-

DIRECT TESTIMONY
OF
MICHAEL J. VILBERT
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

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I. INTRODUCTION AND SUMMARY

Q1. Please state your name and address for the record.

A1. My name is Michael J. Vilbert. My business address is The Brattle Group, 44 Brattle Street, Cambridge, MA 02138, USA.

Q2. Please describe your job and your educational experience.

A2. I am a Principal of The Brattle Group, ("Brattle"), an economic, environmental and management consulting firm with offices in Cambridge, Washington, London and San Francisco. My work concentrates on financial and regulatory economics. I hold a B.S. from the U.S. Air Force Academy and a Ph.D. in finance from the Wharton School of Business at the University of Pennsylvania.

Q3. What is the purpose of your testimony in this proceeding?

A3. My colleague, Dr. A. Lawrence Kolbe and I have been asked by Arizona-American Water Company ("Arizona-American" or the "Company") to estimate the cost of equity that the Arizona Corporation Commission ("ACC" or the "Commission") should allow Paradise Valley Water Company ("Paradise Valley") an opportunity to earn on the equity financed portion of its rate base.

To accomplish this task, I estimate the overall cost of capital for two samples of regulated companies using the discounted cash flow ("DCF") and the risk positioning models. In turn, Dr. Kolbe evaluates the relative risk of Paradise Valley and the sample companies to determine the recommended cost of equity at Paradise Valley's equity thickness of 36.7 percent, which is the percent equity in Paradise Valley's capital structure in the filings in this proceeding.

Q4. Please summarize any parts of your background and experience that are particularly relevant to your testimony on these matters.

A4. Brattle's specialties include financial economics, regulatory economics, and the gas and electric industries. I have worked in the areas of cost of capital, investment risk and related matters for many industries, regulated and unregulated alike, in many forums. I have testified on the cost of capital before the Alberta Energy and Utilities Board, the National Energy Board, the Newfoundland & Labrador Board of Commissioners of Public Utilities, and the Public Service Commission of West Virginia. I have also filed testimony before the U.S. Federal Energy Regulatory Commission. I have not previously testified before this Commission. Appendix A contains more information on my professional qualifications.

Q5. Please summarize how you approached this task.

A5. I review the evidence from two samples, a sample of regulated water utilities and a sample of natural gas local distribution companies ("LDC"). I use the results of the gas LDC sample as a check on the results of the water sample, but I give the results from the water sample predominant weight. My analyses consider cost of capital evidence from the risk positioning and discounted cash flow estimation methods, but I rely primarily on the risk positioning results, because I do not believe that the DCF method is completely reliable at this time.

Specifically, I estimate the cost of equity for the companies in the two benchmark samples using both cost of equity estimation methods. Given the cost of equity estimates for each company and the company's market costs of debt and preferred stock, I calculate each firm's overall cost of capital, i.e., its after-tax weighted-average cost of capital ("ATWACC"), using the company's market value capital structure. For each method of estimating the return on equity, I report the sample average ATWACC and the cost of equity for a capital structure with 36.7 percent equity. I thus present the cost of equity that is consistent with the sample's market information and Paradise Valley's regulatory capital structure. (By "regulatory capital structure," I mean the capital structure that Paradise Valley utilizes in its application.)

This method automatically avoids problems that can arise when an analyst focuses on the individual components of the overall cost of capital separately. The danger in that approach is that the estimated cost of equity may correspond to a very different level of financial risk than would exist at the regulated company's capital structure. The result could be an inconsistency between the allowed return on equity and the regulatory capital structure.

For both samples, the results of the DCF model are more variable and are less reliable than those based upon the risk positioning model; however, I provide results using the DCF method because it is a method that has been used extensively in the past. In addition, the DCF model results serve as a check on the results from the equity risk positioning approach. Risk positioning estimates that rely on the short-term risk-free rate are unreliable at this time because some of the resulting cost of equity estimates are less than the corresponding sample company's cost of debt and because the short-term risk-free rate is likely to increase substantially in the near term.

Q6. What is your conclusion on the market-determined cost of capital for the two samples of regulated companies you selected?

A6. The midpoint of the water sample's overall cost of capital is 6¾ percent with a range of 6½ to 7 percent, and the midpoint of the gas LDC's overall cost of capital is 6½ with a range of 6¼ to 6¾ percent for an overall range of 6¼ to 7 percent. The corresponding cost of equity at Paradise Valley's 36.7 percent equity thickness is 12½ percent (with a range of 12 to 13 percent) for the water sample and 12 percent (with a range of 11½ to 12½ percent) for the gas LDC sample, resulting in an overall range of 11½ to 13 percent.

Note, that I specify a plus or minus ½ percent range for the return on equity and specify the point estimate to the nearest ¼ percent because I do not believe that it is possible to estimate the cost of capital more precisely than that.

Q7. How is your testimony organized?

A7. *Section II* formally defines the cost of capital and touches on the principles relating to the cost of capital and capital structure for a business. Dr. Kolbe's testimony provides additional detail on these points. *Section III* presents the methods used to estimate the cost of capital for the benchmark samples and the associated numerical analyses, and explains the basis of my conclusions for the benchmark samples' returns on equity and overall costs of capital. Appendices B and C support *Section III* with additional details on the risk positioning and DCF approaches, respectively, including the details of the numerical analyses. Note that portions of the testimony are repeated in the appendices in order to give the reader the context of the issues before additional technical detail and further discussion are presented.

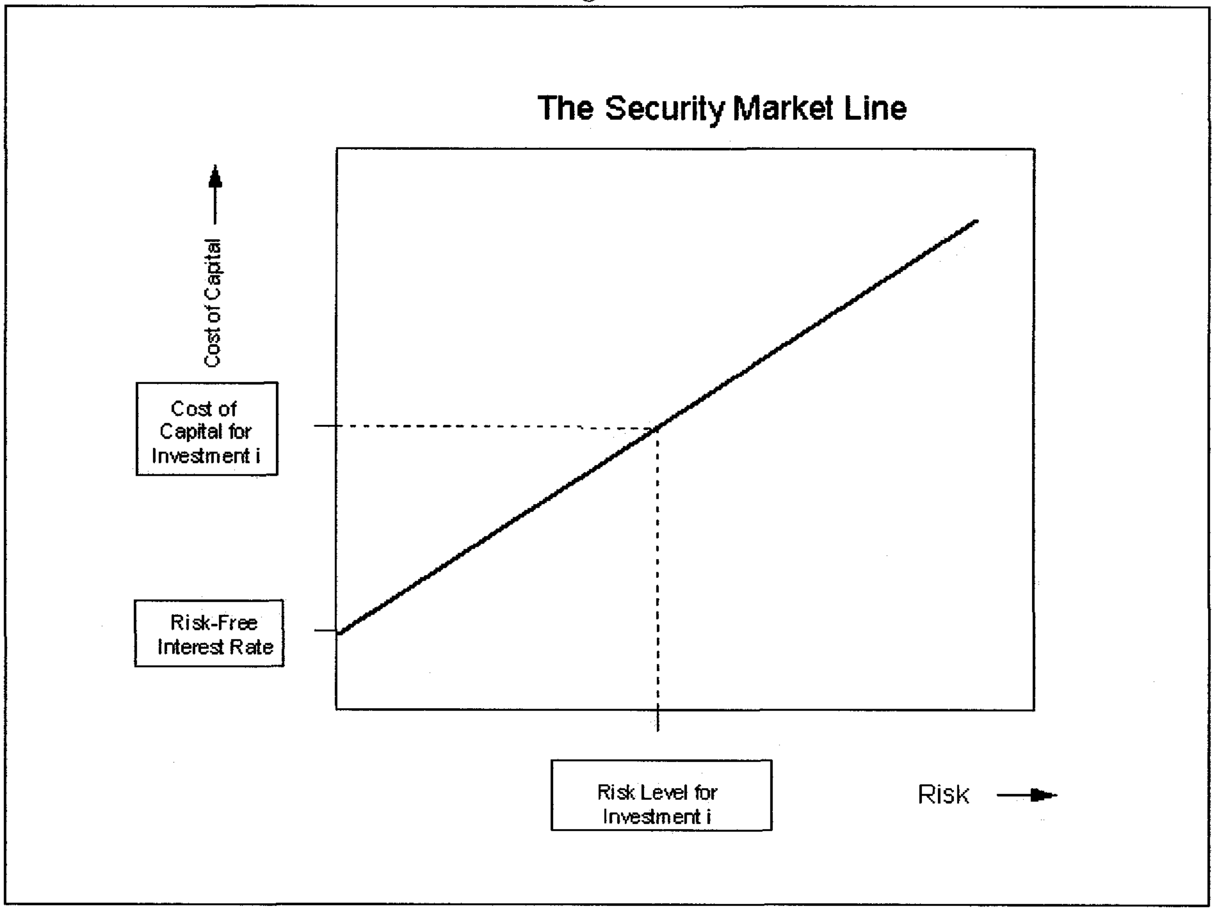
II. DETERMINANTS OF THE COST OF CAPITAL

A. THE COST OF CAPITAL AND RISK

Q8. Please formally define the "cost of capital."

A8. The *cost of capital* can be defined as *the expected rate of return in capital markets on alternative investments of equivalent risk.* In other words, it is the rate of return investors require based on the risk-return alternatives available in competitive capital markets. The cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk. "Expected" is used in the statistical sense: the mean of the distribution of possible outcomes. The terms "expect"and "expected" in this testimony, as in the definition of the cost of capital itself, refer to the probability-weighted average over all possible outcomes.

Figure 1



The definition of the cost of capital recognizes a tradeoff between risk and return that is known as the "security market risk-return line," or "security market line" for short. This line is depicted in Figure 1. The higher the risk, the higher the cost of capital. A version of Figure 1 applies for all investments. However, for different types of securities, the location of the line may depend on corporate and personal tax rates.

Q9. Why is the cost of capital relevant in rate regulation?

A9. It has become routine in U.S. rate regulation to accept the "cost of capital" as the right expected rate of return on utility investment.[1] From an economic perspective, rate levels that give investors a fair opportunity to earn the cost of capital are the lowest levels that compensate investors for the risks they bear. Over the long run, an expected return above the cost of capital makes customers overpay for service. Regulatory commissions normally try to prevent such outcomes, unless there are offsetting benefits (e.g., from incentive regulation that reduces future costs). At the same time, an expected return below the cost of capital shortchanges investors. In the long run, such a return denies the company the ability to attract capital, to maintain its financial integrity, and to expect a return commensurate with that of other enterprises attended by corresponding risks and uncertainties. Dr. Kolbe's testimony discusses the consequences of a systematic failure to give investors a fair opportunity to earn the cost of capital.

Of course, the cost of capital cannot be estimated with perfect certainty, and other aspects of the way the revenue requirement is set may mean investors expect to earn more or less than the cost of capital even if the allowed rate of return equals the cost of capital

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[1] To the best of my knowledge, the first paper formally to link the cost of capital as defined by financial economics with the right expected rate of return for utilities is Stewart C. Myers, *Application of Finance Theory to Public Utility Rate Cases*, *The Bell Journal of Economics and Management Science*, 3:58-97 (Spring 1972).

exactly. However, a commission that on average sets rates so investors expect to earn the cost of capital treats both customers and investors fairly, and acts in the long-run interests of both groups.

B. THE RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND THE COST OF EQUITY

Q10. Please explain why it is necessary to report the cost of equity adjusted for capital structure.

A10. Dr. Kolbe's testimony covers this topic in detail. Briefly, rate regulation in North America evolved to focus on the components of the overall cost of capital, and in particular, on what the "right" cost of equity and capital structure should be. The overall cost of capital depends primarily on the business the firm is in, while the costs of the debt and equity components depend not only on the business risk but also on the distribution of revenues between debt and equity. The overall cost of capital is thus the more basic concept. As Dr. Kolbe's testimony explains, the overall cost of capital is constant within a broad middle range, but the distribution of the costs and risks among debt and equity is not. Appendix B of Dr. Kolbe's testimony sets out the principles and procedures on which I rely.

C. IMPLICATIONS FOR ANALYSIS

Q11. Please explain the implications of the relationship between capital structure and the cost of equity on your testimony.

A11. An approach that estimates the cost of equity for each of the sample firms without explicit consideration of the market value capital structure underlying those costs risks material errors. The costs of equity of the sample companies at their actual market-value capital structures do not necessarily correspond to the financial risk faced by equityholders in the regulated company, and thus could lead to an unfair rate of return. I avoid this problem by calculating each sample company's ATWACC using its market value capital structure. Using the sample's average overall cost of capital, I then determine the corresponding return on equity at Paradise Valley's regulatory capital structure. This procedure ensures that the capital structure and the estimated cost of equity are consistent.

In the following analyses, I estimate the cost of equity for each of the sample firms using the traditional estimation methods. I use each company's estimated cost of equity along with Arizona-American's marginal tax rate and each company's cost of debt and market-value capital structure to estimate the sample company's overall cost of capital. I then calculate the sample average overall cost of capital for each equity estimation method for both of the samples. Using the procedure discussed above, I then determine the cost of equity at Paradise Valley's regulated capital structure for each estimation method that is consistent with the sample's overall cost of capital information.

III. THE COST OF CAPITAL FOR THE BENCHMARK SAMPLES

Q12. How is this section of your testimony organized?

A12. As noted in *Section II*, I estimate the cost of capital using two samples of comparable risk companies. This section first covers matters such as sample selection, market-value capital structure determination, and the sample companies' costs of debt. It then covers estimation of the cost of equity for the sample companies and the resulting estimates of the sample's overall after-tax cost of capital. Next, it analyzes these data to reach a conclusion on the overall cost of capital and the corresponding cost of equity at Paradise Valley's regulatory capital structure for both of the benchmark samples.

A. PRELIMINARY DECISIONS

Q13. What preliminary decisions are needed to implement the above principles?

A13. I must select the benchmark samples, calculate the sample companies' market-value capital structures, and determine the sample companies' market costs of debt and preferred equity.

1. The Samples: Water Utilities and Gas Local Distribution Companies

Q14. Why is it necessary to use two samples?

A14. The overall cost of capital for a part of a company depends on the risk of the business in which the *part* is engaged, *not* on the overall risk of the parent company on a consolidated basis. According to financial theory, the overall risk of a diversified company equals the market-value-weighted average of the risks of its components.

Estimating the cost of capital for Paradise Valley's regulated assets is the subject of this proceeding. The ideal sample would be a number of companies that are publicly traded "pure plays" in the water production, storage, treatment, transmission and distribution line of business. "Pure play" is an investment term referring to companies with operations only in one line of business. Publicly traded firms, firms whose shares are freely traded on stock exchanges, are ideal because the best way to infer the cost of capital is to examine evidence from capital markets on companies in the given line of business.

In this case, a sample of companies whose operations are concentrated solely in the regulated portion of the water industry would be ideal. Unfortunately, the available sample of pure "water" companies in the U.S. is relatively small and has serious data deficiencies. See Section III.C.1 for a description of these deficiencies.

My standard selection procedures require data from Moody's, *Value Line*, IBES and Compustat, along with a high percentage of revenue from regulated operations, no merger activity, no dividend cuts or other activity that could cause the growth rates or beta estimates to be biased. However, if these standards were applied to the companies in the water sample it would leave at most only two companies in the sample.[2] Even these two companies have relatively low trading volumes and other data issues that make cost of

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[2] American States Water Co. and California Water Service.

capital estimation procedures less reliable.[3] A two company sample is simply too small to provide reliable results so I keep the other companies in my sample.

Q15. But if this is the best available sample of regulated water utilities, what else can be done?

A15. Given the weaknesses of the water sample, it is prudent to compare the cost of capital estimates from the water sample to estimates from another, more reliable sample of regulated companies. Absent a comparison to another sample, the expert can have insufficient confidence that the estimates from the water sample are valid, because one or two observations in a small sample can have a disproportionate impact on the results.

To address the weaknesses noted for the water sample, a sample of companies whose operations are concentrated in the natural gas distribution business is used. This sample, whose operations are in a regulated portion of the natural gas industry, provides an additional benchmark against which to compare the results of the water sample. The gas LDC sample consists of larger companies with very high proportion of revenues from rate regulated activities and has been selected to eliminate those companies with company-specific factors that may affect the cost of capital estimates.

Additional details of the sample selection process for each sample are described below as well as in Appendix B.

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[3] American States Water Co. has some merger activity and only one IBES forecast.

Q16. If the business risk of the second sample differs from the water sample, would not that invalidate any comparison between the cost of equity estimated for the second sample and the risk a water company?

A16. No. Even though the business and financial risk of the two samples may differ, the analyst can still make use of the information from the more reliable sample to evaluate the reliability of the estimates from the water sample.

Q17. Please elaborate on the way two samples with different business and financial risks can be compared.

A17. The overall cost of capital for a part of a company depends on the risk of the business in which the *part* is engaged, *not* on the overall risk of the parent company on a consolidated basis. According to financial theory, the overall risk of a diversified company equals the market value weighted-average of the risks of its components.

Calculating the overall after-tax weighted average cost of capital for each sample company as described above allows the analyst to estimate the average overall cost of capital for the sample. The ATWACC captures both the business risk and the financial risk of the sample companies in one number. This allows comparison of the cost of capital between two samples on a much more informed basis. If the alternative (more reliable) sample is judged to have slightly different risk than the water sample, but the results show wide differences in the ATWACC estimates, the analyst should carefully consider the validity of the water sample estimates, whether they are materially higher or lower than the alternative sample's estimates. Of course, the alternative sample could be the source of the error, but that is less likely because the alternative sample has been selected precisely because of its expected reliability.

Q18. Please compare the characteristics of the water utility sample and the gas LDC sample.

A18. The two samples differ primarily in that they operate in two different (regulated) industries, but they are very similar in terms of the percentage of revenues from regulated operations and the customers they serve. Both samples earn a large percentage of their revenue from regulated activities and serve a mix of residential, industrial, and other customers. However, the gas LDC sample has fewer of the data and estimation issues identified above for the water sample. Please refer to Appendix B for addition details comparing the two samples.

2. Market-Value Capital Structure

Q19. What capital structure information do you require?

A19. For reasons discussed in Dr. Kolbe's testimony and explained in detail in his Appendix B, explicit evaluation of the market-value capital structures of the sample companies is vital for a correct interpretation of the market evidence on the return on equity. This requires estimates of the market values of common equity, preferred equity and debt, and the current market costs of preferred equity and debt.

Q20. Please describe how you calculate the market values of common equity, preferred equity and debt.

A20. I estimate the capital structure for each sample company by estimating the market values of common equity, preferred equity and debt from the most recent publicly available data. The details are in Appendix B.

Briefly, the market value of common equity is the price per share times the number of shares outstanding. For the risk positioning approach, I use the last five trading days of each year to calculate the market value of equity for the year. I then calculate the average capital structure over the corresponding five-year period used to estimate the "beta" risk measures for the sample companies. This procedure matches the estimated beta to the degree of financial risk present during its estimation period. In the DCF analyses, I use the average stock price over 15 trading days ending on the release date of the IBES growth rate forecasts utilized in the DCF analysis.[4]

The market value of debt is estimated at its book value, because market and book values of debt do not differ much in the U.S. at this time. The market value of preferred stock for the samples is also set equal to its book value because the market values and book values do not differ much and because the percent of preferred stock in the capital structures of the sample companies is relatively small compared to the debt and common equity components.

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[4] April 1, 2005 for both the water utility sample and the gas LDC sample except for Aqua American whose estimate is from April 8, 2005.

3. Market Costs of Debt and Preferred

Q21. How do you estimate the current market cost of debt?

A21. The market cost of debt for each company in the DCF analysis is the current yield reported in the Mergent Bond Record for an index of public utility company bonds corresponding to the sample company's current debt rating (or the five-year average debt rating for the risk positioning models) as classified by Moody's.[5] Calculation of the after-tax cost of debt uses the Company's estimated marginal income tax rate for 2005 of 39.5 percent.

Q22. How do you estimate the market cost of preferred equity?

A22. For both samples, the cost of preferred equity is set equal to the yield on an index of preferred stock as reported in the Mergent Bond Record corresponding to Moody's rating of each sample company's preferred stock.

B. COST OF EQUITY ESTIMATION METHODS

Q23. How do you estimate the cost of equity for your sample companies?

A23. Recall the definition of the cost of capital from the outset of my testimony: the expected rate of return in capital markets on alternative investments of equivalent risk. My cost of capital estimation procedures address three key points implied by the definition:

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[5] For some companies in the water utility sample, S&P's ratings were used. Details are in Appendix B.

1. Since the cost of capital is an *expected* rate of return, it cannot be directly observed; it must be inferred from available evidence.
2. Since the cost of capital is determined *in capital markets* (*e.g.*, the New York Stock Exchange), data from capital markets provide the best evidence from which to infer it.
3. Since the cost of capital depends on the return offered by alternative investments *of equivalent risk*, measures of the risks that matter in capital markets are part of the evidence that needs to be examined.

Q24. How does the above definition help in cost of capital estimation?

A24. The definition of the cost of capital recognizes a tradeoff between risk and expected return, plotted above in Figure 1, the security market line. Cost of capital estimation methods take one of two approaches: (1) they try to identify a comparable-risk sample of companies and to estimate the cost of capital directly; or (2) they establish the location of the security market line and estimate the relative risk of the security, which jointly determine the cost of capital. In terms of Figure 1, the first approach focuses directly on the vertical axis, while the second focuses both on the security's position on the horizontal axis and on the position of the security market line.

The first type of approach is more direct, but ignores the wealth of information available on securities not thought to be of precisely comparable risk. The "discounted cash flow" or "DCF" model is an example. The second type of approach, sometimes known as "equity risk premium approach," requires an extra step, but as a result can make use of information on all securities, not just a very limited subset. The capital asset pricing model ("CAPM") is an example. While both approaches can work equally well if conditions are right, one may be preferable to the other under other circumstances. In particular, approaches that rely on the entire security market line are less sensitive to deviations from the assumptions that underlie the model, all else equal. I examine both DCF and risk positioning approach evidence for the samples.

1. Risk Positioning Approach

Q25. Please explain the risk positioning method.

A25. The risk positioning method estimates the cost of equity as the sum of a current interest rate and a risk premium. It is therefore sometimes also known as the "risk premium" approach. This approach may sometimes be applied informally. For example, an analyst or a commission may check the spread between interest rates and what is believed to be a reasonable estimate of the cost of capital at one time, and then apply that spread to changed interest rates to get a new estimate of the cost of capital at another time.

More formal applications of the risk positioning approach take full advantage of the security market line depicted in Figure 1: they use information on all securities to identify the security market line and derive the cost of capital for the individual security based on that security's relative risk. This reliance on the entire security market line makes the method less vulnerable to the kinds of problems that arise for the DCF method, which relies on one stock at a time. The risk positioning approach is widely used and underlies most of the current research published in academic journals on the nature, determinants and magnitude of the cost of capital.

Section I of Appendix B to this testimony provides more detail on the principles that underlie the risk positioning approach. Section II of Appendix B provides the details of the risk positioning approach empirical estimates I obtain.

Q26. How are the "more formal" applications of risk positioning approach implemented?

A26. The first step is to specify the current values of the benchmarks that determine the security market line. The second is to determine the security's, or investment's, relative risk. The third is to specify exactly how the benchmarks combine to produce the security market line, so the company's cost of capital can be calculated based on its relative risk.

a. Security Market Line Benchmarks

Q27. What benchmarks are used to determine the location of the security market line?

A27. The essential benchmarks that determine the security market line are the risk-free interest rate and the premium that a security of average risk commands over the risk-free rate. This premium is commonly referred to as the "market risk premium" ("MRP"), *i.e.*, the excess of the expected return on the average common stock over the risk-free interest rate. In the risk positioning approach, the risk-free interest rate and MRP are common to all securities.

A security-specific measure of relative risk (beta) is estimated separately and combined with the MRP to obtain the company-specific risk premium.

Q28. What benchmark do you use for the MRP?

A28. I estimate two versions of the risk positioning model. The first version measures the risk premium versus a long-term Government interest rate. The second version measures the market risk premium as the risk premium of average-risk common stocks over short-term Treasury bills, which is the usual measure of the MRP used in capital market theories. To determine the cost of capital in a regulatory proceeding, the market risk premium should be used with a *forecast* of the same interest rate (*i.e.*, the short-term or long-term Government bond rate).

Q29. How do you estimate the MRP?

A29. As explained in Appendix B, there is presently little consensus on "best practice" for estimating the MRP. (Note: this is not the same thing as saying that all practices are equally good). For example, the leading graduate textbook in corporate finance, after recommending for many years use of the arithmetic average realized excess return on the market (which for a while was noticeably over 9 percent in the U.S.), now reviews the current state of the research and expresses the view that a range between 6 to 8.5 percent is reasonable for the U.S.[6]

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[6] Richard A. Brealey and Stewart C. Myers, *Principles of Corporate Finance*, 7th ed., New York: McGraw-Hill/Irwin (2003), pp. 153-160.

My testimony considers both the historical evidence and the results of scholarly studies of the factors that affect the risk premium for average-risk stocks in order to estimate the benchmark risk premium investors currently expect. In particular, I rely on historical differences between the S&P 500 Index ("S&P 500") and the risk-free rate.

Considering all the evidence, I conclude that S&P 500 stocks of average risk today command a premium of at least 8.0 percent over the short-term risk-free rate and 6.5 percent over the long-term Government rate. The estimation of the MRP is discussed in greater detail in Appendix B.

Q30. What value do you use for the other benchmark you mentioned, the risk-free interest rate?

A30. I require an interest rate forecast for both long-term Government bonds and short-term Treasury bills which corresponds to the long-term and short-term risk premiums discussed. For the analyses that follow, I use a value of 3.0 percent for the short-term risk-free interest rate and a value of 5.0 percent for the long-term risk-free interest rate as the benchmark interest rates in the risk positioning analyses, but I give no weight to the estimates using the short-term risk-free rate. The derivation of these values is discussed below.

b. Relative Risk

Q31. What measure of relative risk do you use?

A31. I examine the "beta" of the stocks in question. Beta is a measure of the "systematic" risk of a stock — the extent to which a stock's value fluctuates more or less than average when the market fluctuates.

The basic idea behind beta is that risks that cannot be diversified away in large portfolios matter more than those that can be eliminated by diversification. Beta is a measure of the risks that *cannot* be eliminated by diversification. This concept is explored further in Appendix B.

Q32. What does a particular value of beta mean?

A32. By definition, a stock with a beta equal to 1.0 has average non-diversifiable risk: it goes up or down by 10 percent on average when the market goes up or down by 10 percent. Stocks with betas above 1.0 exaggerate the swings in the market: stocks with betas of 2.0 tend to fall 20 percent when the market falls 10 percent, for example. Stocks with betas below 1.0 are less volatile than the market. A stock with a beta of 0.5 will tend to rise 5 percent when the market rises 10 percent.

Q33. How do you estimate beta?

A33. For both samples, I use betas reported by *Value Line* for reasons discussed below.

c. Cost of Equity Capital Calculation

Q34. How do you combine the preceding steps to estimate the cost of equity?

A34. By far the most widely used approach to combine a risk measure with the benchmark market risk premium on common stocks to find a risk premium for a particular firm or industry is the Capital Asset Pricing Model. However, the CAPM is only one risk positioning technique.

I rely on another risk positioning approach in addition to the CAPM. Empirical research has long shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premia than predicted by the CAPM and high beta stocks tend to have lower risk premia than predicted. A number of variations on the original CAPM theory have been proposed to account for this finding.

This finding can be used directly to estimate the cost of capital, using beta to measure relative risk, without simultaneously relying on the CAPM. Here I examine results from both the CAPM and a version of the security market line based on the empirical finding that risk premia are related to beta, but are not as sensitive to beta as the CAPM predicts, to convert the betas into a risk premium. I refer to this latter model as the "ECAPM," where ECAPM stands for *Empirical* Capital Asset Pricing Model. The formula for the ECAPM is

$$k = r_f + a + \beta \times (MRP - a). \qquad \textbf{(1)}$$

where k is the cost of capital, r_f is the risk-free interest rate, MRP is the market risk premium, β is the measure of relative risk, and a is the empirical adjustment factor.

Research supports values for a of from two to seven percent when using a short-term interest rate. I use baseline values of a of 2 percent for the short-term risk-free rate and 0.5 percent for the long-term risk-free rate. I also conduct sensitivity tests for different values of a. For the short-term risk-free rate I use values for a of 1, 2 and 3 percent. For the long-term risk-free rate I use values for a of 0, 0.5 and 1.5 percent. See Appendix B for a more detailed discussion of the ECAPM model and Table No. MJV-B1 for a summary of the empirical evidence on the size of the required adjustment.

Q35. Why is it appropriate to use the ECAPM model?

A35. Empirical tests of the CAPM have repeatedly shown that an investment' s return is related to systematic risk, but that the increase in return for an increase in risk is *less* than is predicted. The empirical tests have also shown that the theoretical intercept, as measured by the return on Treasury bills, is too low to fit the data. In other words, the empirical tests indicate that the slope of the CAPM is too steep and the intercept is too low. The empirical data support for the ECAPM. The ECAPM recognizes the consistent empirical observation that the CAPM underestimates (overestimates) the cost of capital for low (high) beta stocks. The ECAPM corrects the predictions of the CAPM to more closely match the results of the empirical tests. Ignoring the results of the tests of the CAPM would lead to an estimate of the cost of capital that is likely to be less accurate than is possible.

Q36. Is the use of the ECAPM equivalent to increasing the estimated betas for the sample companies?

A36. No. Fundamentally, this is *not* an adjustment (increase) in beta. This can easily be seen by the fact that the expected return on high beta stocks is lower with the ECAPM than when estimated by the CAPM. The ECAPM model is a recognition that the actual slope of the risk-return tradeoff is flatter than predicted and the intercept higher based upon repeated empirical tests of the model. The Merrill Lynch adjustment in betas and the ECAPM capture two distinct features of the risk positioning model. Even if the beta of the sample companies were estimated accurately, the CAPM would still underestimate the required return for low beta stocks. Even if the ECAPM were used, the costs of equity would be underestimated if the betas were underestimated.

2. Discounted Cash Flow Method

Q37. Please describe the discounted cash flow approach.

A37. The DCF model takes the first approach to cost of capital estimation, i.e., to attempt to estimate the cost of capital in one step. The method assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow stream:

$$P = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \ldots + \frac{D_T}{(1+k)^T} \qquad \textbf{(2)}$$

where "P" is the market price of the stock; "D_i" is the dividend cash flow expected at the end of period i; "k" is the cost of capital; and "T" is the last period in which a dividend cash flow is to be received. The formula just says that the stock price is equal to the sum of the expected future dividends, each discounted for the time and risk between now and the time the dividend is expected to be received.

Most DCF applications go even further, and make very strong (*i.e.*, unrealistic) assumptions that yield a simplification of the standard formula, which then can be rearranged to estimate the cost of capital. Specifically, if investors expect a dividend stream that will grow *forever* at a steady rate, the market price of the stock will be given by a very simple formula,

$$P = \frac{D_1}{(k-g)} \qquad \textbf{(3)}$$

where "D_1" is the dividend expected at the end of the first period, "g" is the perpetual growth rate, and "P" and "k" are the market price and the cost of capital, as before. Equation (3) is a simplified version of Equation (2) that can be solved to yield the well known "DCF formula" for the cost of capital:

$$k = \frac{D_1}{P} + g = \frac{D_0 x (1+g)}{P} + g \qquad \textbf{(4)}$$

where "D_0" is the current dividend, which investors expect to increase at rate g by the end of the next period, and the other symbols are defined as before. Equation (4) says that if Equation (3) holds, the cost of capital equals the expected dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as the simple DCF model. Of course, the "simple" model is simple because it relies on very strong (*i.e.*, very unrealistic) assumptions.

Q38. Are there other versions of the DCF models besides the "simple" one?

A38. Yes. I also consider a variant of the DCF model that relies on *slightly* less strong assumptions in that it allows for varying growth rates in the near term before assuming a perpetual growth rate after year ten. This is a variant of the "multi-stage" DCF method. The DCF models are described in detail in Section I. A of Appendix C. (Section II of Appendix C provides the details of my empirical DCF results.)

Q39. What are the merits of the DCF approach?

A39. The DCF approach is conceptually sound if its assumptions are met, but can run into difficulty in practice because those assumptions are so strong, and hence so unlikely to correspond to reality. Two conditions are well known to be necessary for the DCF approach to yield a reliable estimate of the cost of capital: the variant of the present value formula that is used must actually match the variations in investor expectations for the dividend growth path; and the growth rate(s) used in that formula must match current investor expectations. Less frequently noted conditions may also create problems. (See Appendix C for details.)

Q40. Do you agree that estimating the right growth rate is the most difficult part for the implementation of the DCF approach?

A40. Yes. Finding the right growth rate(s) is the usual "hard part" of a DCF application. The original approach to estimation of *g* relied on average historical growth rates in observable variables, such as dividends or earnings, or on the "sustainable growth" approach, which estimates *g* as the average book rate of return times the fraction of earnings retained within the firm. But it is highly unlikely that these historical averages over periods with widely varying rates of inflation and costs of capital will equal current growth rate expectations. This is particularly true for the water sample.

Moreover, the constant growth rate DCF model *requires* that dividends and earnings grow at the same rate for companies that earn their cost of capital on average.[7] It is inconsistent with the theory on which the model is based to have different growth rates in earnings and dividends over the period when growth is assumed to be constant. If the growth in dividends and earnings were expected to vary over some number of years before settling down into a constant growth period, then it would be appropriate to estimate a multistage DCF model. In the multistage model, earnings and dividends can grow at different rates, but *must* grow at the same rate in the final, constant growth rate period. A

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[7] Why must the two growth rates be equal in a steady-growth DCF model? Think of earnings as divided between reinvestment, which funds future growth, and dividends. If dividends grow faster than earnings, there is less investment and slower growth each year. Sooner or later dividends will equal earnings. At that point, growth is zero because nothing is being reinvested (dividends are constant). If dividends grow slower than earnings, each year a bigger fraction of earnings are reinvested. That makes for ever faster growth. Both scenarios contradict the steady-growth assumption. So if you observe a company with different expectations for dividend and earnings growth, you know the company's stock price and its dividend growth forecast are inconsistent with the assumptions of the steady-growth DCF model.

difference between forecasted dividend and earnings rates therefore is a signal that the facts do not fit the assumptions of the simple DCF model.

Q41. How do you estimate the growth rates you use in your DCF analysis?

A41. I use earnings growth rate forecasts from IBES and *Value Line*. Analysts' forecasts are superior to using single variables in time series forecasts based upon historical data as has been documented and confirmed extensively in academic research. Please see Section I in Appendix C for a detailed discussion on this issue.

Q42. Are you aware that the Commission staff relies on an average of historical growth rates of earnings and dividends as well as forecasts of earnings and dividend growth rates to estimate the growth rate for the DCF model?

A42. Yes, but I do not believe that this is the best way to estimate the growth rate for use in the DCF model for the following reasons. First, as mentioned above, the model requires that dividends and earnings grow at the same rate at some point in the future in order to apply the model. The data on historical growth rates do not confirm this condition. Second, analysts have access to historical information and include that information in their forecast of earnings growth rates. In other words, using historical data provides no additional information to that captured in analyst forecasts. Finally, averaging wildly different growth rate estimates in the hopes of having the extremes cancel out calls into question whether the DCF model is applicable at this time to the sample companies.

Q43. What about the evidence that analyst earning growth forecasts have been optimistic (over estimated earnings and dividend growth) in the past?

A43. Although analyst forecasts have been optimistic on average in the past, this problem is less acute for regulated companies. In addition, the use of a two-stage DCF model that substitutes the forecast growth of GDP mitigates analyst optimism by substituting the GDP growth rate for the potentially optimistic (or pessimistic) earnings forecasts of analysts.

Q44. How well are the constant-growth rate conditions necessary for the reliable application of the DCF likely to be met for the sample companies at present?

A44. The requisite conditions for the sample companies are not fully met at this time, particularly for the water sample. Of particular concern for this proceeding is the uncertainty about what investors truly expect the long-run outlook for the sample companies to be. The longest time period available for growth rate forecasts of which I am aware is five years. The long-run growth rate (*i.e.*, the growth rate after the water industry settles into a steady state, which may be *beyond* the next five years for this industry) drives the actual results one gets with the DCF model. Unfortunately, this implies that unless the company or industry in question is stable, so there is little doubt as to the growth rate investors expect, DCF results in practice can end up being driven by the subjective judgment of the analyst who performs the work.

Of the six companies in the water sample relied upon for the DCF analysis, three companies have only two longer term earnings forecasts available (one from *Value Line* and one from IBES).[8] In addition, the average long-term earnings forecasts vary from a low of 6.0 percent to a high of 10.0 percent (Table No. MJV-5), well above the 5.3 percent forecast of the long-term growth rate of GDP.[9] However, the 5-year growth rate estimates for the gas LDC sample are much more homogeneous. The values range from a low of 4.0 percent to a high of 6.7 percent growth rate (Table No. MJV-16), which on average are consistent with the 5.3 percent forecast of the long-term growth in the U.S. GDP. As discussed above, the two-stage DCF model also adjusts for any over optimistic (or pessimistic) growth rate forecasts by adjusting the 5-year growth rate forecasts of the analysts toward the long-term GDP growth rate in the years after year 5. See Appendix C, Section I for a discussion of the two-stage model.

The DCF growth rates whether estimated from historical data or from analyst forecasts are likely to be affected by the fact that there has been a number of mergers and acquisitions in the water industry in recent years, and the industry is showing signs of becoming globalized.[10] Thus, the industry appears to be moving towards a larger degree of consolidation – at least among the privately held water utilities. Additionally, new

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[8] Of these three companies, the *Value Line* earnings forecast for Middlesex Water Co. and York Water Co. pertain to 2006 and is therefore not a 5-year forecast.

[9] Blue Chip Economic Indicators, March 10, 2005 p. 15.

[10] Philadelphia Suburban (renamed Aqua America) completed the acquisition of AquaSource for about $195 million in July 2003. The company also acquired or merged with several local water utilities. Additionally, American Water Works acquired National Enterprises, Inc., Azurix, and the water and wastewater utility assets of Citizens Utilities. American Water Works, in turn, was acquired by RWE AG on January 10, 2003. Domestic energy companies have also invested in the water utility business, although presently many of those investments have or will be sold. Allete has sold its assets in Florida and North Carolina; Indianapolis Water Company was sold by NISource; Suez Lyonnaise des Eaux purchased the remaining shares of United Water Resource that it did not already own; and Thames Water purchased E'Town Corporation. (Sources: *Value Line Investment Survey*, January 30, 2004, *The Business Journal* and company web sites)

environmental regulation may impact the industry as standards for water quality evolve over time, and there is potential for new safety and security requirements in the future. The industry has no federal regulator (other than for environmental and health issues), and state public utility commissions regulate most investor owned water utilities. Different regulatory bodies may lead to differing regulatory requirements for companies operating in adjacent parts of the country. Taken together, these factors mean that it may be some time before the water industry settles into anything investors will see as a stable equilibrium necessary for the application of the DCF model in a completely reliable way.

Such circumstances imply that a commission may often be faced with a wide range of DCF estimates, none of which can be well grounded in objective data on true long-run growth expectations, *because no such objective data now exist.* DCF for firms or industries in flux is *inherently* subjective with regard to the most important parameter, the long-run growth rate, that drives the answer one gets.

In short, the unavoidable questions about the DCF model's strong assumptions cause me to view the DCF method as *inherently* less reliable than the risk positioning approach described above. However, because the DCF method has been widely used in the past and in other forums when the industry's economic conditions were different from today's, I submit DCF evidence in this case. DCF estimates also serve as a check on the values provided by the risk positioning methods.

In this proceeding I give no weight to the DCF results for the water sample, but I give some weight to the DCF results for the gas LDC sample because that segment of the industry has been relatively stable. Although there has been an increase in the pace of mergers and acquisitions in the gas LDC segment of the industry, and some LDC companies reported revenue from trading activities (especially in the 2000-01 period), my sample selection procedures have largely excluded companies affected by these factors. In addition, the 5-year growth rate forecasts for the gas LDC sample companies are very similar indicating a relatively high degree of stability for the companies included in the sample. These factors imply that the results of the DCF model for the gas LDC sample deserve some weight in estimating the cost of capital.

C. THE WATER UTILITY SAMPLE BENCHMARK

1. Water Utility Sample Selection

Q45. How did you select your sample of water utilities?

A45. To construct this sample, I started with the universe of companies classified as water utility companies in *Value Line.* The goal was to create a sample of companies whose primary business is as a regulated water utility with business risk generally similar to that of Paradise Valley. I report all results for both the full sample and for the sample without Southwest Water Company which earns a relatively low percentage (about 40%) of its revenue from regulated water utility activities and without York Water Company because of a series of data issues including the lack of growth forecast and historical bond ratings, its small size and the very thin trading of its equity.[11] Companies in this subsample earned at least 86 percent of their revenue from regulated water utility activities in 2004. Additional details of the sample selection process for the water sample are in Appendix B.

Q46. Earlier you said that the sample of water utilities had serious data weaknesses. Please elaborate on these weaknesses.

A46. In attempting to apply the DCF model to the sample, only three companies have five-year earnings forecasts from more than one Institutional Brokers Estimate System ("IBES") analyst out of the eight water utilities for which data are available. Three of these utilities have only one long-term growth forecast and two have no long-term growth forecast from IBES. Similarly, only three companies have long-term growth forecasts from *Value Line*. The result of this lack of data is that the discounted cash flow model only can be applied to six companies. Of these companies, the estimated cost of capital is based on two analysts for three of the companies. A similar lack of data exists when looking at the companies' bond ratings. For two of the eight companies, neither a Moody's nor a Standard and Poor's ("S&P") bond rating was found.[12]

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[11] York Water traded an average of about 6,000 shares per day in 2004. Additionally, York Water Co. has no long-term *Value Line* earnings growth forecasts, and only one year's (2004) bond rating for the company is available.

[12] For three of the six companies with a Moody's or Standard and Poor's bond rating, the bond rating was only found for some years during the most recent 5-year period. The rating for periods for which no bond rating was found was set equal to the rating for later periods. For companies without a bond rating, an A-rating is used in the analysis. The A-rating is consistent with the average for companies listed as water utilities in *Value Line* and followed by either Moody's or Standard and Poor's. Additionally, interest coverage ratios for the companies without a Moody's or S&P bond rating were computed and were either within or close to the S&P's guidelines for an A-rating. Bond ratings were obtained from www.moodys.com, Compustat, Mergent Bond Record, and S&P's Bond Rating books.

The size of the companies in the water sample also makes cost of capital estimation difficult. All companies except Aqua America and California Water have less than $500 million in market value of equity. More important, however, is the fact that the stock of these companies trades relatively infrequently. For example, three of the eight water utilities traded an average of less than 10,000 shares per trading day during the last five days of 2004 as well as during the year. Only Aqua America and Southwest Water had an average trading volume above 50,000 shares per day in 2004. This compares to an average trading volume of approximately 139,000 shares for the companies in the gas LDC sample.[13] Low trading volume causes concern because there may be a delay between the release of important information and the time that this information is reflected in prices. Such delay is well known to cause beta estimates to be statistically insignificant and possibly biased.

In addition to lack of data and the small size of the companies, there are firm-specific events that render the water utility sample less reliable than would be ideal. First, Aqua America (the largest of the companies) has gone through several mergers and acquisitions in recent years. Normally, I would not include companies with significant merger or acquisition activity in a sample because the individual information about the progress of the proposed merger is so much more important for the determination of the company's stock price than day-to-day market fluctuations. In practice, beta estimates for such companies

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[13] Trading volume varies substantially within the gas LDC sample with KeySpan trading being by far the largest volume per day. The average trading volume of the gas LDC sample without KeySpan is around 87,500 shares per day.

tend to be too low. Second, Southwest Water Co. earns only approximately 40 percent of its revenue from regulated activities. I therefore also report my results for the subsample of companies that do not include Southwest Water Co. and York Water Co. which has serious data problems.

It is because of these weaknesses in the water sample that I also utilize a sample of natural gas LDCs.

2. Risk Positioning Cost of Capital Estimates

Q47. How is your testimony on the risk positioning approach cost of capital estimates organized?

A47. This section first describes the input data used in the CAPM and ECAPM models, then reports the resulting cost of equity estimates for the sample. The second section of Appendix B details the empirical analysis.

a. Interest Rate Forecasts

Q48. How do you determine the expected risk-free interest rate?

A48. I start with the current rates from the constant maturity U.S. Government bond yield data available from the St. Louis Federal Reserve Bank. For the period March 28 to April 15, 2005, the average yield on 30-day Treasury bills is about 2.65 percent and the average yield on long-term government bonds is 4.85 percent. See Table No. MJV-12. The Federal Reserve ("Fed") recently raised the Fed funds rate to 3.0 percent, and the press releases associated with the increase suggest that the Fed will continue a measured increase in interest rates in order to dampen inflationary forces in the economy.[14] The actions of the Fed indicate that interest rates are likely to continue to increase in the future.

Q49. Do you apply any adjustment to the current interest rates?

A49. Yes. I round up the values listed in Exhibit No. MJV-12 because forecasts indicate that interest rates are likely to increase in the future as the Fed acts against inflation, but the current yield on Treasury bills is still likely to be unreliable as a measure of the short-term risk-free rate in the CAPM. I use a value of 3.0 percent for the short-term rate and 5.0 percent for the long-term rate in the analysis, but this is likely to be an underestimate of the interest rates prevailing during the period rates from this proceeding are likely to be in effect.

Q50. Please explain why there is a problem with using the yields on Treasury bills as the risk-free rate in risk positioning analysis at this time.

A50. The risk-free interest rate used in the risk positioning model should correspond to the market risk premium used. This is the reason for using a short-term interest rate with the MRP estimated with reference to short-term interest rates and a long-term interest rate with the MRP estimated with reference to long-term rates. However, yields on Government debt

[14] Federal Reserve Board, Press Release, May 3, 2005. (Note: This press release "corrects previous release") "Fed Again Increases Key Rate by o.25%," by Nell Henderson, *Washington Post*, March 23, 2005, and "Minutes Highlight Federal Reserve Concerns About Inflation," by Jeannie Aversa, *Washington Post*, April 12, 2005.

have fallen in response to interest rate cuts by the Federal Reserve Bank. Yields on Treasury bills in the recent past had fallen to less than 1 percent as the Fed cut interest rates in an effort to stimulate the economy. As the possibility of inflation has reappeared, the Fed has begun to raise interest rates in 25 basis point increments so that the Federal funds rate now stands at 3.0 percent. The expectation is that the Fed will continue its gradual increase in interest rates in an effort to insure that inflation does not again become a problem.

Q51. What is the effect of using the short-term risk-free rate in the risk positioning model at this time?

A51. The result is cost of equity estimates that are *less* than the company's corresponding cost of debt for some of the sample companies. This result is clearly contrary to the most basic of financial theory and can not represent a valid estimate of the cost of equity for those companies. There is no theory of which I am aware that supports the notion that the cost of a company's debt would be more than its cost of equity. The cost of equity estimates for those companies whose estimated cost of equity exceeds the company's corresponding cost of debt are also likely to biased downward because the short-term interest rate is still not at a level that is consistent with its historic relationship to long-term interest rates. It is for this reason that I ascribe no value to the risk positioning estimates based upon the short-term risk-free rate.

Q52. What values do you use for the short-term and long-term risk-free interest rates?

A52. I use a value of 3.0 percent for the short-term risk-free interest rate and a value of 5.0 percent for the long-term risk-free interest rate as the benchmark interest rates in the risk positioning analyses, but I give no weight to the estimates using the short-term risk-free rate.

b. Betas and the Market Risk Premium

Q53. What beta estimates did you use in your analysis for the samples?

A53. I rely upon the most recent betas estimated by *Value Line* for both the water sample and for the gas LDC sample.

Q54. Are the beta values reported by *Value Line* adjusted betas?

A54. Yes. *Value Line* reports betas that are adjusted by a process that is very similar to that used by Merrill Lynch. I use adjusted betas when the sample companies display statistically significant sensitivity to interest rate changes. Please refer to Appendix B for a discussion of the test for interest rate sensitivity. Neither of the two samples in this proceeding display such sensitivity, so I reverse the adjustment process to get "unadjusted" beta values.

Q55. What is Merrill Lynch's adjustment procedure?

A55. Merrill Lynch reports two types of betas, the second is an adjustment of the first to compensate for sampling errors in the directly estimated betas. The Merrill Lynch adjustment moves the estimated betas toward a value of one, the average stock beta. The

Merrill Lynch adjustment is designed as a correction for the tendency of companies with low estimated betas to have negative sampling errors and for companies with high estimated betas to have positive sampling errors, which means that the measured betas of companies tend to be closer to one in subsequent measurement periods. Many practitioners routinely use Merrill Lynch adjusted betas for this reason, but that is not the reason that I use adjusted betas. I use adjusted betas to correct for the underestimation of the betas of companies regulated on the basis of original cost rate base resulting from their increased sensitivity to interest rates.

After reversing the adjustment process discussed above, the average estimated *Value Line* beta for the water sample is 0.46 while the average for the gas LDC sample is 0.56.

Q56. What value do you use for the market risk premium?

A56. For the premium over short-term risk-free interest rate I use 8.0 percent, while for the premium over long-term risk-free interest rate I use 6.5 percent, for the reasons discussed above and in Appendix B.

Q57. Please explain the method to adjust for differences in capital structure.

A57. Starting with the ATWACC, the cost of equity for any capital structure within a broad range of capital structures can be determined by the following formula:

$$\text{Return on equity} = \frac{(\text{ATWACC - Return on debt} \times \text{\% debt in capital structure} \times \text{tax rate})}{\text{\% equity in capital structure}}$$

This is the calculation that is displayed in Table No. MJV-11 and in Table No. MJV-22. The tables display the result of converting the sample average ATWACC to a return on equity for a specific capital structure. It is straightforward to determine the cost of equity consistent with capital structure utilizing this method.

c. Risk Positioning Results

Q58. What are the cost of equity estimates derived from the risk positioning approach for the water sample?

A58. Using the long-term interest rate in the two risk positioning models (CAPM and ECAPM), with two values of the ECAPM parameter (0.5% and 1.5%), I obtain three estimates of each sample company's cost of equity. These results are displayed in Table MJV-9, Panel A. The cost of equity estimates are combined with the estimates of the company's cost of debt and preferred to calculate the company's ATWACC. These calculations and the resulting sample average ATWACC are presented in Table No. MJV-10, Panels A-C for each of the estimating methods. The sample average ATWACC and cost of equity at Paradise Valley's 36.7 percent equity capital structure are displayed in Table No. MJV-11. Panel A shows the cost of equity and ATWACC value for all water sample companies, while Panel B shows the results for the subsample of companies with significant revenue from regulated water utility activities.[15] These results are also shown in Table 1 below.

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[15] Also excluding York Water Co. as discussed above.

Using the short-term interest rate in the two risk positioning models (CAPM and ECAPM) and using different values for the ECAPM parameter, *a*, I obtain four estimates of each sample companies' cost of equity. These estimates are displayed in Table No. MJV-9, Panel B. The estimated cost of equity for some companies in the sample is *less* than its corresponding market cost of debt. Such a result is nonsense and I, therefore, do not report or rely upon the results of the short-term risk-free rate version of the risk-positioning model to estimate the cost of capital for Arizona-American.

Table 1: Panel A

Water Regulated Utility Sample
Risk Positioning After-Tax Weighted-Average Cost of Capital and
Cost of Equity Estimates for All Sample Companies

Using Long-Term Risk-Free Rate	ATWACC	Cost of Equity
CAPM	6.4%	11.7%
ECAPM (a = 0.5%)	6.6%	12.2%
ECAPM (a = 1.5%)	7.0%	13.2%

Source: Table No. MJV-11.

Table 1: Panel B

**Water Regulated Utility Sample
Risk Positioning After-Tax Weighted-Average Cost of Capital and
Cost of Equity Estimates for Companies with a Large Fraction of Revenue
from Regulated Water Activities**

Using Long-Term Risk-Free Rate	ATWACC	Cost of Equity
CAPM	6.5%	12.0%
ECAPM (a = 0.5%)	6.7%	12.4%
ECAPM (a = 1.5%)	7.1%	13.4%

Source: Table No. MJV-11.

3. The DCF Cost of Capital Estimates

Q59. Did you estimate cost of equity using the DCF method for the water sample?

A59. Yes, I estimate the cost of capital for the water sample companies for which I have IBES or Value Line forecasts.[16]

Q60. What steps do you take in your DCF analyses?

A60. Given the above discussion of DCF principles, the steps are to collect the data, estimate the sample companies' costs of equity at their current capital structures, and then to adjust the sample's estimates to Paradise Valley's 36.7 percent equity ratio.

[16] For the both samples, I obtained IBES forecasts from Thompson's Research as of April 1, 2005 except for Aqua America Inc. whose IBES forecast is as of April 8, 2005. I obtained *Value Line* growth forecasts from *Value Line Investment Survey* as of January 28, 2005 for the water sample and March 18, 2005 for the gas LDC sample. No DCF analysis was performed for Connecticut Water Services or for SJW Corporation because no current long-term growth forecasts were found for either company.

a. Growth Rates

Q61. What growth rate information do you use?

A61. For reasons discussed above and in Appendix C, historical growth rates today are not relevant as forecasts of current investor expectations for these samples. I therefore use rates forecast by security analysts.

The ideal in a DCF application would be a detailed forecast of future dividends, year by year well into the future until a true steady state (constant) dividend growth rate was reached, based on a large sample of investment analysts' expectations. I know of no source of such data. Dividends are ultimately paid from earnings, however, and earnings forecasts from a number of analysts are available for a few years. Investors do not expect dividends to grow in lockstep with earnings, but for companies for which the DCF approach can be used reliably (*i.e.*, for relatively stable companies whose prices do not include the option-like values described in Appendix C), they do expect dividends to track earnings over the long-run. Thus, use of earnings growth rates as a proxy for expectations of dividend growth rates is a common practice.

Accordingly, the first step in my DCF analysis is to examine a sample of investment analysts' forecasted earnings growth rates from IBES and *Value Line* to the degree such forecasts are available. The details are in Appendix C. At present, *Value Line* data run through a 2007-2009 horizon for the water sample (2008-2010 for the gas LDC sample), which represents on average about a 4 year forecast (from the 1st quarter of 2005 to the end of 2008). IBES also provides a long-term earnings growth rate estimates. The longest-horizon forecast growth rates from these sources underlie my simple DCF model (*i.e.*, the standard perpetual-growth model associated with the "DCF formula," dividend yield plus growth). Unfortunately, the longest growth forecast data only go out for a period of about five years, which is too short a period to make the DCF model completely reliable. I also use the very short-run growth information over the next few years and the long-run GDP growth rate forecast in a modest attempt at obtaining a multi-stage DCF estimate using company-specific growth rates.

Q62. Do these growth rates correspond to the ideal you mentioned above?

A62. No. While forecasted growth rates are the quantity required in principle, the forecasts need to go far enough out into the future so that it is reasonable to believe that investors expect a stable growth path afterwards. As can be seen in Workpaper #3 to Table No. MJV-5, Panel C for the water sample and Workpaper # 3 to Table No. MJV-16, Panel C for the gas LDC sample, the growth rate estimates do not support the view that investors are expecting growth rates equal to the single perpetual growth rate assumed in the simple DCF model. The growth rate forecasts vary substantially in the short-term, and the five-year growth rate forecasts are also quite different from company to company. However, the five-year growth rate forecasts for the gas LDC sample vary much less from company to company than do the five-year growth rate forecasts for the water companies. There are also generally fewer analysts forecasting earnings for the companies in the water sample. It is clear that much longer detailed growth rate forecasts than those currently available from IBES and *Value*

Line would be needed to implement the DCF model in a completely reliable way for these two samples at this time; however, the general stability of the 5-year growth rate forecasts for the gas LDC sample indicates a higher degree of reliability for the gas LDC sample than for the water sample at this time.

b. Dividend and Price Inputs

Q63. What values do you use for dividends and stock prices?

A63. Dividends are for the 1st quarter of 2005, the most recent dividend information available at the time of estimation.[17] This dividend is grown at the estimated growth rate and divided by the price described below to estimate the dividend yield for the simple DCF model.

Stock prices are an average of closing stock prices for the 15-day trading period ending April 1, 2005 except for Aqua America Corp. for which stock price information ends on April 8, 2005. These dates coincide with the release of the IBES growth forecasts for the companies. A 15-day stock price average is used to guard against anomalous price changes in any single day.

c. DCF Results

Q64. What are the DCF estimates for the samples?

A64. The data are used in the two versions of the DCF method to get sample company estimates at the sample company's capital structure. The resulting return on equity at Paradise

[17] The 1st quarter 2005 dividend information was obtained from Compustat.

Valley's 36.7 percent equity capital structure are shown in Table 2 along with the sample average ATWACC numbers. These results are much higher on average than the water sample's risk positioning approach results, but I do not believe that these results are reliable for the reasons discussed above. I give them no weight in my estimate of the overall cost of capital for the sample.

Table 2: Panel A

Water Regulated Utility Sample
Discounted Cash Flow After-Tax Weighted-Average Cost of Capital and Cost of Equity Estimates for All Companies

	ATWACC	Cost of Equity
Simple DCF Method (Quarterly)	8.1%	16.2%
Multi-Stage DCF Using the Long-Term GDP Forecast as the Perpetual Rate	6.9%	12.9%

Source: Table No. MJV-8.

Table 2: Panel B

Water Regulated Utility Sample
Discounted Cash Flow After-Tax Weighted-Average Cost of Capital and Cost of Equity Estimates for Companies with a Large Fraction of Revenue from Regulated Water Activities

	ATWACC	Cost of Equity
Simple DCF Method (Quarterly)	8.2%	16.5%
Multi-Stage DCF Using the Long-Term GDP Forecast as the Perpetual Rate	7.0%	13.2%

Source: Table No. MJV-8.

D. THE GAS LOCAL DISTRIBUTION COMPANIES

1. Sample Selection for the Gas Local Distribution Sample

Q65. How do you select your sample of gas local distribution companies?

A65. One reason for use of the gas LDC sample is to generate a sample of regulated companies whose primary source of revenues is in the regulated portion of the natural gas industry to provide a check for the results of the water sample. Therefore, I started with the universe of publicly traded gas distribution utilities covered by *Value Line Investment Survey*, and I required the sample companies to have revenues from regulated natural gas distribution that is 50 percent or more of total revenue. The final sample includes eight companies. I also report results for a subsample of companies that have had no significant merger activities and no dividend cuts for the last five years. These companies are also characterized by having generated more than 70 percent of their revenue from regulated activities during the relevant period.[18] The subsample consists of six companies for the risk positioning analysis and five companies for the DCF analysis. Appendix B discusses the selection process for the gas LDC sample in more detail.

2. Risk Positioning Cost of Capital Estimates

Q66. What are the cost of equity estimates resulting from the risk positioning model for the gas LDC sample companies?

A66. As with the water sample, the data are used to obtain four cost of equity estimates for risk premium approach for the sample companies using the short-term risk-free rate and three cost of equity estimates using the long-term risk-free rate. Consistent with the results for the water sample, the estimates of the cost of equity using the short-term risk-free rate are less than the market cost of debt for some companies and are unreliable.

The cost of equity estimates for the sample companies using the long-term risk-free rate are displayed in Table No. MJV-20, Panel A. The cost of equity estimates are combined with the estimates of the company's cost of debt and preferred to calculate the company's ATWACC. These calculations and the resulting sample average ATWACC are presented in Table No. MJV-21, Panels A-C for each of the estimating methods. The sample average ATWACC and cost of equity at Paradise Valley's 36.7 percent equity capital structure are displayed in Table No. MJV-22. These results are also shown in Table

[18] The relevant period is the most recent fiscal year (2004) for the DCF analysis and the most recent five years for the risk positioning analysis.

3 below. Panel A shows the cost of equity and ATWACC value for all gas LDC sample companies. Table 3, Panel B shows the results for the subsample of companies with no mergers or dividend cuts. As can be seen by a comparison of Panel A of Tables 1 and 3, the overall cost of capital and resulting cost of equity estimates for the gas LDC sample are nearly identical to those for the water sample for the full sample. A comparison of Panel B of Tables 1 and 3 shows that the gas LDC subsample has a somewhat lower estimated cost of equity than does the water sample. Because I have great confidence in the statistical quality of the gas LDC sample, these results give me a degree of assurance that the results of the water sample are reasonable.

Table 3: Panel A

Gas LDC Sample

Risk Positioning After-Tax Weighted-Average Cost of Capital and Cost of Equity Estimates for All Sample Companies

Long-Term Risk-Free Rate	**ATWACC**	**Cost of Equity**
CAPM	6.4%	11.7%
ECAPM ($a = 0.5\%$)	6.6%	12.0%
ECAPM ($a = 1.5\%$)	6.8%	12.7%

Source: Table No. MJV-22.

Table 3: Panel B

Gas LDC Sample
Risk Positioning After-Tax Weighted-Average Cost of Capital and Cost of Equity Estimates for Companies with No Mergers or Dividend Cuts

Long-Term Risk-Free Rate	ATWACC	Cost of Equity
CAPM	6.3%	11.3%
ECAPM (*a* = 0.5%)	6.4%	11.7%
ECAPM (*a* = 1.5%)	6.7%	12.4%

Source: Table No. MJV-22.

3. The DCF Cost of Capital Estimates

Q67. Is there any difference between gas LDC companies you rely upon for your risk positioning method and for your DCF method?

A67. Yes. Peoples Energy is part of the risk positioning subsample, but it is not part of the DCF subsample because the portion of revenues from regulated activities has declined recently so that it is less than 70 percent in 2004 even though the five-year average is over 70 percent. (See Table No. MJV-13)

Q68. What DCF cost of equity estimates do you obtain for the sample?

A68. The growth rate in the DCF method is the weighted average of the growth estimates from IBES and *Value Line*. The resulting costs of equity and ATWACCs are shown in Table 4. The results for the simple DCF model are more than 1.0 percent lower than for the water sample, but the results for the multi-stage DCF model are mixed. The full sample multistage DCF results are higher for the gas LDC than for the water sample, but the water and gas LDC subsample results are very similar. However, the gas LDC results are much more consistent between the full sample and the subsample and between the simple DCF and the multistage DCF models. As a result of the consistency of the results and the relative stability of the growth rate estimates, I give some slight weight to the DCF results for the gas LDC sample. Specifically, the DCF results together with the risk positioning results for the subsample of the gas LDC sample lead me to round the risk positioning cost of equity estimates upward to the nearest ¼ percent.

Table 4: Panel A

Gas LDC Sample
Discounted Cash Flow After-Tax Weighted-Average Cost of Capital and Cost of Equity Estimates for All Companies

Discounted Cash Flow Method	**ATWACC**	**Cost of Equity**
Simple DCF (Quarterly)	7.1%	13.6%
Multi-Stage DCF Using the Long-Term GDP Forecast as the Perpetual Rate	7.2%	13.8%

Source: Table No. MJV-19.

Table 4: Panel B

Gas LDC Sample
Discounted Cash Flow After-Tax Weighted-Average Cost of Capital and Cost of Equity Estimates for Companies with No Merger or Dividend Cuts

Discounted Cash Flow Method	ATWACC	Cost of Equity
Simple DCF (Quarterly)	7.0%	13.3%
Multi-Stage DCF Using the Long-Term GDP Forecast as the Perpetual Rate	7.0%	13.1%

Source: Table No. MJV-19.

E. THE TWO SAMPLES' COST OF CAPITAL

Q69. What conclusions do you draw from the above data regarding each sample's cost of equity at Paradise Valley's 36.7 percent equity ratio?

A69. The estimated costs of equity from the DCF model are substantially higher than the estimates from the risk positioning model for both samples. The simple DCF model that relies on company-specific growth rate forecasts vary significantly among companies and are less reliable because the long-run growth rate forecast drives the results, and there are *no* objective data on the long-run growth rate investors truly expect, *nor* on when the industry is expected to settle down into some sort of stable-growth equilibrium.

The cost of equity estimates that rely on the multi-stage DCF model are also uniformly higher than the risk positioning estimates for both samples. Although I do not rely upon the DCF model results for the water sample, I believe that DCF cost capital estimates provide a useful check on the risk positioning results for the gas LDC sample. The uniformly higher DCF results suggest that the risk positioning estimates are probably downward biased for the gas LDC sample and perhaps for the water sample, as well.

Q70. Do you have any comments regarding the results of the risk positioning models?

A70. Yes. The relative risk measure, beta, used in the models is derived from 260 weeks (5 years) of historical data. Ordinarily, using historical data to estimate beta is not a serious problem because the overall business risk of an industry probably does not change rapidly. For an industry undergoing major changes, however, the beta estimates based upon the historical data may not capture the full changes in risk in the industry. This is true even though information on the probability and provisions of industry changes have been available some months ago. However, as explained in Appendix B, such "decoupling" of beta from the market appears to be a common feature of industries undergoing structural changes. This factor also suggests that the risk positioning estimates may be downward biased and is consistent with the information from the DCF models.

Q71. Given your view of the current value of the DCF method for this industry, what conclusions do you draw from the risk positioning results?

A71. The risk positioning results are summarized above in Table 1 and Table 3. Of those results, the CAPM values deserve the least weight, because this method does not adjust for the empirical finding that the cost of capital is less sensitive to beta than predicted by the

CAPM (which my testimony considers by using the ECAPM). Conversely, the ECAPM numbers deserve the most weight, because this method adjusts for the empirical findings. The cost of equity estimates at a 36.7 percent equity thickness range from 11.7 to 13.2 percent for the water sample (12.0 to 13.4 percent for the subsample) and 11.7 to 12.7 percent for the gas LDC sample (11.3 to 12.4 percent for the subsample). The estimates based upon the short-term risk-free rate are unreliable and not reported here.

The middle value in both Table 1 and Table 3 for the full sample shows an ATWACC of 6.6 percent for both the water and the gas LDC samples with a corresponding cost of equity of 12.2 percent and 12.0 percent respectively, . Although the average ATWACC for both full samples is 6.6 percent (ECAPM with a = 0.5), the sample estimated costs of equity displayed in Panel B of Table No. MJV-10 compared to Panel B of Table No. MJV-21 are higher on average for the gas LDC. This result is consistent with the increased financial leverage in the LDC sample (57% market value equity ratio) compared to the water sample (67% market value equity ratio) and demonstrates the importance of considering differences in financial leverage when evaluating the results of cost of capital estimation models. The results for the water subsample are slightly higher than for the full sample which implies that the estimates for the full sample are slightly downward biased. The gas LDC subsample results are about 40 basis points lower than for the full sample. Taken together, the analyses confirm that the overall risk of the two samples is very similar although the market value capital structures differ substantially.

Based upon the evidence, the point estimates for the overall cost of capital estimates for the two samples are 6¾ percent for the water sample and 6½ percent for the gas LDC sample. Although the gas LDC subsample results are slightly lower than the full sample, I round the estimate for the overall cost of capital up to the nearest ¼ percent for the gas LDC sample up because of the DCF results. However, it is more correct to say that the sample results indicate a range of values. The ranges are 6½ to 7 percent for the water sample and 6¼ to 6¾ for the gas LDC sample for an overall range of 6¼ to 7 percent for the two samples combined. The corresponding point estimates for the cost of equity are 12½ percent (12 to 13 percent range) for the water sample and 12 percent (11½ to 12½ range) for the gas LDC sample for a capital structure with 36.7 percent equity. This results in an overall range for the cost of equity of 11½ to 13 percent.

As previously noted, in estimating the cost of equity I round to the nearest ¼ percent (25 basis points) because I do not believe that cost of capital estimates can be made more precisely than that.

Q72. Does this conclude your testimony?

A72. Yes.

Appendix A: QUALIFICATIONS OF MICHAEL J. VILBERT

Michael Vilbert is an expert in cost of capital, financial planning and valuation who has advised clients on these matters in the context of a wide variety of investment and regulatory decisions. He received his Ph.D. in Financial Economics from the Wharton School of the University of Pennsylvania, an MBA from the University of Utah, an M.S. from the Fletcher School of Law and Diplomacy, Tufts University, and a B.S. degree from the United States Air Force Academy. He joined *The Brattle Group* in 1994 after a career as an Air Force officer, where he served as a fighter pilot, intelligence officer, and professor of finance at the Air Force Academy.

REPRESENTATIVE CONSULTING EXPERIENCE

- In a securities fraud case, Dr. Vilbert designed and created a model to value the private placement stock of a drug store chain if there had been full disclosure of the actual financial condition of the firm. He analyzed key financial data and security analysts reports regarding the future of the industry in order to recreate pro forma balance sheet and income statements under a variety of scenarios designed to establish the value of the firm.

- For pharmaceutical companies rebutting price-fixing claims in antitrust litigation, Dr. Vilbert was a member of a team which prepared a comprehensive analysis of industry profitability. The analysis replicated, tested and critiqued the major recent analyses of drug costs, risks and returns. The analyses helped develop expert witness testimony to rebut allegations of excess profits.

- For an independent electrical power producer, Dr. Vilbert created a model that analyzed the reasonableness of rates and costs filed by a natural gas pipeline. The model not only duplicated the pipeline's rates, but it also allowed simulation of a variety of "what if" scenarios associated with cost recovery under alternative time patterns and joint cost allocations. Results of the analysis were adopted by the intervenor group for negotiation with the pipeline.

- For the CFO of an electric utility, Dr. Vilbert developed the valuation model used to support a stranded cost estimation filing. The case involved a conflict between two utilities over the responsibility for out-of-market costs associated with a power purchase contract between them. In addition, he advised and analyzed cost recovery mechanisms that would allow full recovery of the stranded costs while providing a rate reduction for the company's rate payers.

- Dr. Vilbert has assisted in the preparation of testimony and the development of estimation models in numerous cost of capital cases for natural gas pipeline and electric utility clients before the FERC and state regulatory commissions. These have spanned standard estimation techniques (DCF, CAPM) and have also developed and applied more advanced models specific to the industries or lines of business in question, *e.g.*, based on the structure and risk characteristics of cash flows, or based on multi-factor models that better characterize regulated industries.

- Dr. Vilbert has valued several large, residual oil-fired generating stations to evaluate the possible conversion to natural gas or other fuels. In these analyses, the expected pre- and post-conversion station values were computed using a range of market electricity and fuel cost conditions.

- For a major western electric utility, Dr. Vilbert helped prepare testimony that analyzed the prudence of QF contract enforcement. The testimony demonstrated that the utility had not been compensated for major disallowances for QF contract management in its allowed cost of capital.

- Dr. Vilbert was a member of a team which analyzed the economic need for a major natural gas pipeline expansion to the Midwest. This involved evaluating forecasts of natural gas use in various regions of the United States and the effect of additional supplies on the pattern of natural gas pipeline use. The analysis was used to justify the expansion before the FERC and the National Energy Board of Canada.

- For a Public Utility Commission in the northeast, Dr. Vilbert analyzed the auction of an electric utilities purchase power agreements to determine whether the outcome of the auction was in the ratepayers' interest. The work involved the analysis of the auction procedures as well as the benefits to ratepayers of transferring risk of the PPA payments to the buyer.

- Dr. Vilbert led a team tasked to determine whether bridge tolls were "just and reasonable" for a non-profit port authority. Determination of the revenue requirement of the authority required estimation of the ratebase value of the authority's assets using the trended original cost methodology as well as evaluation of the operations and maintenance budgets. Investment costs, bridge traffic information and inflation indices covering a 75 year period were utilized to estimate the value of four bridges and a passenger transit line valued in excess of $1 billion.

- Dr. Vilbert helped a recently privatized railroad in Brazil develop an estimate of its revenue requirements, including an estimate of its cost of capital, and evaluate alternative rate structures designed to provide economic incentives to shippers as well as to the railroad for improved service. This involved the explanation and analysis of the contribution margin of numerous products and shippers, improved cost analysis and evaluation of bottlenecks in the system.

- For a southeastern utility, Dr. Vilbert was part of a team quantifying the company's stranded costs under several legislative electric restructuring scenarios. This involved the evaluation of all of the company's fossil and nuclear generating units, its contracts with Qualifying Facilities and the prudence of those QF contracts. He provided analysis concerning the impact of securitizing the company's stranded costs as a means of reducing the cost to the rate payers and several alternative designs for recovering stranded costs.

- For a recently privatized electric utility in Australia, Dr. Vilbert evaluated the proposed regulatory scheme of the Australian Competition and Consumer Commission for the company's electric transmission system. The evaluation highlighted the elements of the proposed regulation which would impose uncompensated asymmetric risks on the company and the need to either eliminate the asymmetry in risk or provide additional compensation so that the company could expect to earn its cost of capital.

- For an electric utility in the southwest, Dr. Vilbert helped design and create a model to estimate the stranded costs of the company's portfolio of Qualifying Facilities and Power Purchase contracts. This exercise was complicated by the many variations in the provisions of the contracts that required modeling in order to capture the effect of changes in either the performance of the plants or in the estimated market price of electricity.

- Dr. Vilbert helped prepare the testimony responding to a FERC request for further comments on the appropriate return on equity for electric transmission facilities. In addition, Dr. Vilbert was a member of the team that made a presentation to the FERC staff on the expected risks of the unbundled electric transmission line of business.

- Dr. Vilbert and Mr. Frank C. Graves, also of *The Brattle Group*, prepared testimony evaluating an innovative Canadian stranded cost recovery procedure involving the auctioning of the output of the Province's electric generation plants instead of the plants themselves. The evaluation required the analysis of the terms and conditions of the long-term contracts specifying the revenue requirements of the plants for their entire forecast remaining economic life and required an estimate of the cost of capital for the plant owners under this new stranded cost recovery concept.

- Dr. Vilbert served as the neutral arbitrator for the valuation of an petroleum products tanker. The valuation required analysis of the Jones Act tanker market and the supply and demand balance of the available U.S. constructed tanker fleet.

TESTIMONY

Direct and rebuttal testimony before the Alberta Energy and Utilities Board on behalf of TransAlta Utilities Corporation in the matter of an application for approval of its 1999 and 2000 generation tariff, transmission tariff, and distribution revenue requirement, October 1998.

Direct testimony before the Federal Energy Regulatory Commission on behalf of Central Maine Power in Docket No. ER00-982-000, December 1999.

Direct testimony before the Alberta Energy and Utilities Board on behalf of TransAlta Utilities Corporation for approval of its 2001 transmission tariff, May 2000.

Direct testimony before the Federal Energy Regulatory Commission on behalf of Mississippi River Transmission Corporation in Docket No. RP01-292-000, March 2001.

Written evidence, Rebuttal, Reply and further Reply before the National Energy Board in the matter of an application by TransCanada PipeLines Limited for orders pursuant to Part I and Part IV of the *National Energy Board Act*, May 2001, Nov. 2001, Feb. 2002.

Written evidence before the Public Utility Board on behalf of Newfoundland & Labrador Hydro - Rate Hearings, October 2001.

Direct testimony (with Bill Lindsay) before the Federal Energy Regulatory Commission on behalf of DTE East China, LLC in Docket No. ER02-1599-000, April 2002.

Direct and rebuttal reports before the Arbitration Panel in the arbitration of stranded costs for the City of Casselberry, FL, Case No. 00-CA-1107-16-L, July 2002.

Direct reports before the Arbitration Board for Petroleum products trade in the Arbitration of the Military Sealift Command vs. Household Commercial Financial Services, fair value of sale of the Darnell, October 2002

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Written Evidence before the National Energy Board in the matter of the National Energy Board Act, R.S.C. 1985, c. N–7, as amended, (Act) and the Regulations made under it; and in the matter of an application by TransCanada PipeLines Limited for orders pursuant to Part IV of the *National Energy Board Act*, for approval of Mainline Tolls for 2004, January 2004.

Direct and Rebuttal Testimony before the Public Service Commission of West Virginia, on Cost of Capital for West Virginia-American Water Company, Case No 04-0373-W-42T, May 2004

Appendix B: EQUITY RISK PREMIUM APPROACH METHODOLOGY: DETAILED PRINCIPLES AND RESULTS

TABLE OF CONTENTS

Q1. What is the purpose of this appendix?

A1. This appendix reviews the principles behind the equity risk premium methodology, describes the estimation of the parameters used in the models, the sample selection procedures and the details of the cost of capital estimates obtained from this methodology. This appendix intentionally repeats portions of my direct testimony, because I want the reader to be able to have a full discussion of the issues addressed here, rather than having to continually turn back to the corresponding section of the testimony.

I. EQUITY RISK PREMIUM APPROACH METHODOLOGY PRINCIPLES

Q2. How is this section of the appendix organized?

A2. It first reviews the basic nature of the equity risk premium approach. It then discusses the individual components of the model: the benchmark risk premium, the relative risk of the company or line of business in question, the appropriate interest rate, and the combination of these elements in a particular equity risk premium model.

A. THE BASIC EQUITY RISK PREMIUM MODEL

Q3. How does the equity risk premium model work?

A3. The equity risk premium approach estimates the cost of equity as the sum of a current interest rate and a risk premium. (It therefore is sometimes also known as the "risk premium" or the "risk positioning" approach.)

This approach may sometimes be applied informally. For example, an analyst or a commission may check the spread between interest rates and what is believed to be a reasonable estimate of the cost of capital at one time, and then apply that spread to changed interest rates to get a new estimate of the cost of capital at another time.

More formal applications of equity risk premium method implement the second approach to cost of capital estimation. They use information on all securities to identify the security market line (Figure 1 in the body of the testimony) and derive the cost of capital for the individual security based on that security's relative risk. This equity risk premium approach is widely used and underlies most of the current scholarly research on the nature, determinants and magnitude of the cost of capital.

Q4. How are "more formal applications" put into practice?

A4. The essential benchmarks that determine the security market line are the risk-free interest rate and the premium that a security of average risk commands over the risk-free rate. This premium is commonly referred to as the "market risk premium" ("MRP"), *i.e.*, the excess of the expected return on the average common stock over the risk-free interest rate. In the equity risk premium approach the risk-free interest rate and MRP are common to all securities. A security-specific measure of relative risk (beta) is estimated separately and combined with the MRP to obtain the company-specific risk premium.

In principle, there may be more than one factor affecting the expected stock return, each with its own security-specific measure of relative risk and its own benchmark risk premium. For example, the "arbitrage pricing theory" and other "multi-factor" models have been proposed in the academic literature. These models estimate the cost of capital as the sum of a risk-free rate and several security-specific risk premiums. However, none of these alternative models has emerged in practice as "the" improvement to use instead of the original, single-factor model. I use the traditional single-factor model in this testimony.

Accordingly, the required elements in my formal equity risk premium approach are the market risk premium, an objective measure of relative risk, the risk-free rate that corresponds to the measure of the market risk premium, and a specific method to combine these elements into an estimate of the cost of capital.

B. MARKET RISK PREMIUM

Q5. Why is a risk premium necessary?

A5. Experience (*e.g.*, the U.S. market's October Crash of 1987) demonstrates that shareholders, even well diversified shareholders, are exposed to enormous risks. By investing in stocks instead of risk-free Government bills, investors subject themselves not only to the risk of earning a return well below those they expected in any year but also to the risk that they might lose much of their initial capital. This is why investors demand a risk premium.

I estimate two versions of the Capital Asset Pricing Model ("CAPM"). The first version measures the market risk premium as the risk premium of average risk common stocks over the long-term risk-free rate. The second version measures the risk premium relative to a short-term risk-free rate, which is the usual measure of the "market risk premium" used in capital market theories.

Q6. Please discuss some of the issues involved in selecting the appropriate MRP?

A6. To determine the cost of capital in a regulatory proceeding, the MRP should be used with a *forecast* of the same interest rate used to calculate the MRP (*i.e.*, the short-term Treasury bill rate or the long-term Government rate). For example, it would be inconsistent to utilize a short-term risk-free with an estimate of the MRP derived from comparisons to long-term interest rates. In addition, the appropriate measure of the MRP should be based upon the arithmetic mean not the geometric mean return.[1] The arithmetic mean is the simple average while the geometric mean is the compound rate of return between two periods.

Q7. How do you estimate the MRP?

A7. There is presently little consensus on "best practice" for estimating the MRP. For example, the latest edition of the leading graduate textbook in corporate finance, after recommending use of the arithmetic average realized excess return on the market for many years (which for a while was noticeably over 9 percent), now reviews the current state of the research and expresses the view that the a range between 6 to 8.5 percent is reasonable for the U.S.[2,3]

My written testimony considers both the historical evidence and the results of scholarly studies of the factors that affect the risk premium for average-risk stocks in order to estimate the benchmark risk premium investors currently expect. I consider the historical difference in returns between the Standard and Poor's 500 Index ("S&P 500") and the risk-free rate, recent

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1 See, for example, Ibbotson Associates, Stocks, Bonds, Bills, and Inflation: Valuation Edition 2005 Yearbook pp. 75-77.

2 Richard A. Brealey and Stewart C. Myers, *Principles of Corporate Finance,* McGraw-Hill, 7th edition, 2003, pp. 153-160.

3 In past editions, the authors expressed the view that they are "most comfortable" with values toward the upper end of that range, but this language does not appear in the 7th edition. Although Professor Myers still holds this view, this language and other sections were dropped to accommodate a request to reduce the length of the text.

academic literature on the MRP and the results of recent surveys to estimate the market risk premium.

Q8. Please summarize the recent literature on the MRP and the conclusions you draw from it?

A8. The new research challenges the conventional wisdom of using the arithmetic average historical excess returns to estimate the MRP. However, after reviewing the issues in the debate, I remain skeptical for several reasons that the market risk premium has declined substantially in the U.S.

First, despite eye-catching claims like "equity risk premium as low as three percent,"[4] and "the death of the risk premium,"[5] not all recent research arrives at the same conclusion. In his presidential address to the American Finance Association in 2001, Professor Constantinides seeks to estimate the unconditional equity premium based on average historical stock returns.[6] (Note that this address was based upon evidence just before the major fall in market value.) He adjusts the average returns downward by the change in price-earnings ratio because he assumes no change in valuations in an unconditional state. His estimates for 1926 to 2000 and 1951 to 2000 are 8.0 percent and 6.0 percent, respectively, over the 3-month T-bill rate. In another published study in 2001, Professors Harris and Marston use the DCF method

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4 Claus, J. and J. Thomas, (2001), "Equity Risk Premium as Low as Three Percent: Evidence from Analysts' Earnings Forecasts for Domestic and International Stocks," *Journal of Finance* 56:1629-1666.

5 Arnott, R. and R. Ryan, (2001), "The Death of the Risk Premium," *Journal of Portfolio Management* 27(3):61-84.

6 Constantinides, G.M. (2002), "Rational Asset Prices," *Journal of Finance* 57:1567-1591.

to estimate the market risk premium for the U.S. stocks.[7] Using analysts' forecasts to proxy for investors' expectation, they conclude that over the period 1982-1998 the MRP over the **long-term risk-free rate** is 7.14 percent. As yet another example, the paper by Drs. Ibbotson and Chen (2003) adopts a supply side approach to estimate the forward looking long-term sustainable equity returns and equity risk premium based upon economic fundamentals. Their equity risk premium **over the long-term risk-free rate** is estimated to be 3.97% in geometric terms and 5.90% on an arithmetic basis. They conclude their paper by stating that their estimate of the equity risk premium is "far closer to the historical premium than being zero or negative."[8]

Professor Ivo Welch surveyed a large group of financial economists in 1998 and 1999. The average of the estimated MRP was 7.1 percent in Prof. Welch's first survey[9] and 6.7 percent in his second survey which was based on a smaller number of individuals. However, a more recent survey by Prof. Welch reported only a 5.5 percent MRP.[10] In characterizing these results Prof. Welch notes that "[T]he equity premium consensus forecast of finance and economics professors seems to have dropped during the last 2 to 3 years, a period with low realized equity premia."[11]

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7 Robert S. Harris and Felicia C. Marston, The Market Risk Premium: Expectational Estimates Using Analysts' Forecasts, *Journal of Applied Finance* 11 (1) 6-16, 2001.

8 Ibbotson, R. and P. Chen (2003), "Stock Market Returns in the Long Run: Participating in the Real Economy," *Financial Analyst Journal*, 59(1):88-98. Cited figures are on p. 97.

9 Ivo Welch (2000), "Views of Financial Economists on the Equity Premium and on Professional Controversies," *Journal of Business*, 73(4):501-537. The cited figures are in Table 2 p. 514.

10 Ivo Welch, 2001, "The Equity Premium Consensus Forecast Revisited," School of Management at Yale University working paper. The cited figure is in Table 2.

11 *Ibid.*, p. 8.

The above quotation from Prof. Welch emphasizes the caution that must attend survey data even from knowledgeable survey participants: the outcome is likely to change quickly with changing market circumstances. Regulatory commissions should not, in my opinion, attempt to keep pace with such rapidly changing opinions.

Third, some of the evidence for negative or close to zero market risk premium simply does not make sense. Despite the relatively high valuation levels, stock returns remain much more volatile than Treasury bond returns. I am not aware of any empirical or theoretical evidence showing that investors would rationally hold equities and not expect to earn a positive risk premium for bearing the risk.

Fourth, I am unaware of a convincing theory for why the future MRP should have substantially declined. At the height of the stock market bubble in the U.S., many claimed that the only way to justify the high stock prices would be if the MRP had declined dramatically,[12] but this argument is heard less frequently now that the market has declined substantially. All else equal, a high valuation ratio such as price-earnings ratio implies a low required rate of return, hence a low MRP. However, there is considerable debate about whether the high level of stock prices (despite the burst of the internet bubble in the last a couple of years) represents the transition to a new economy or is simply an "irrational exuberance," which cannot be sustained for the long term. If the former case is true, then the MRP may have decreased permanently. Conversely, the long-run MRP may remain the same even if expected market returns in the short-term are smaller.

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[12] See Robert D. Arnott and Peter L. Bernstein, "What Risk Premium is 'Normal'?", *Financial Analysts Journal* 58:64-85, for an example.

Another common argument for a lower expected MRP is that the U.S. experienced very remarkable growth in the 20th century that was not anticipated at the start of the century. As a result, the average realized excess return is overestimated meaning the standard method of estimating the MRP would be biased upward. However, one recent study by Profs. Jorion and Goetzmann[13] finds, under some simplifying assumptions, that the so-called "survivorship bias" is only 29 basis points.[14] Furthermore, "[I]f investors have overestimated the equity premium over the second half of the last century, Constantinides (2002) argues that 'we now have a bigger puzzle on our hands'" Why have investors systematically biased their estimates over such a long horizon?[15]

To sum up the above, I cite two passages from Profs. Mehra and Prescott's review of the theoretical literature on equity premium puzzle:[16]

> Even if the conditional equity premium given current market conditions is small, and there appears to be general consensus that it is, this in itself does not imply that it was obvious either that the historical premium was too high or that the equity premium has diminished.
>
> In the absence of this [knowledge of the future], and based on what we currently know, we can make the following claim: over the long horizon the equity premium is likely to be similar to what it has been in the past and the returns to investment in equity will continue to substantially dominate that in T-bills for investors with a long planning horizon.

Q9. Is there other scholarly support for the conclusion?

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[13] Jorion, P., and W. Goetzmann (1999), "Global Stock Markets in the Twentieth Century," *Journal of Finance* 54:953-980.

[14] Dimson, Marsh, and Staunton (2003) make a similar point when they comment on the equity risk premia for 16 countries based on returns between 1900 and 2001: "While the United States and the United Kingdom have indeed performed well, compared to other markets there is no indication that they are hugely out of line." p.4.

[15] Mehra, R., and E.C. Prescott (2003), "The Equity Premium in Retrospect," in *Handbook of the Economics of Finance*, Edited by G.M. Constantinides, M. Harris and R. Stulz, Elsevier B.V, p. 926

[16] *Ibid,* p. 926.

A9. Yes. Another line of research was pursued by Steven N. Kaplan and Richard S. Ruback. They estimate the market risk premium in their article, "The Valuation of Cash Flow Forecasts: An Empirical Analysis."[17] Professors Kaplan and Ruback compare published cash flow forecasts for management buyouts and leveraged recapitalization over the 1983 to 1989 period against the actual market values that resulted from these transactions. One of their results is an estimate of the market risk premium over the long-term Treasury bond yield that is based on careful analysis of actual major investment decisions, not realized market returns. Their median estimate is 7.78 percent and their mean estimate is 7.97 percent.[18] This is considerably higher than my estimate of 6.5 percent. Even if the maturity premium of Treasury bonds over Treasury bills were only 1 percent, well below the best estimate of 1.5 percent the resulting estimate of the market risk premium over Treasury bills is higher than my estimate of 8.0 percent.

Q10. In addition to the scholarly articles and survey evidence you discussed in Section I.B of your Direct Testimony, what other evidence do you consider to estimate the MRP?

A10. I also consider the long-run realized equity premiums reported in Ibbotson Associates *SBBI Valuation Edition 2005 Yearbook.* The data provided cover the period 1926 through 2004. The results are discussed below.

Q11. What is the "long-run realized risk premium"in the U.S.?

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[17] *Journal of Finance*, 50, September 1995, pp. 1059-1093.

[18] *Ibid*, p. 1082.

A11. From 1926 to 2004, the full period reported, Ibbotson Associates data show that the average premium of stocks over Treasury bills is 8.6 percent. I also examine the "post-War" period. The risk premium for 1947-2004 is 8.5 percent.[19] (I exclude 1946 because its economic statistics are heavily influenced by the War years; *e.g.*, the end of price controls yielded an inflation rate of 18 percent. It is not really a "post-War" year, from an economic viewpoint.) These averages often change slightly when another year of data is added to the Ibbotson series. The average premium of stocks over the income returns on long-term Government bonds is 7.2 percent for both the 1926 to 2004 and the 1947 to 2004 periods.

Recently there has been a great deal of academic research on the MRP. This research has put practitioners in a dilemma: there is nothing close to a consensus about how the MRP should be estimated, but a general agreement in the academic community seems to be emerging that the old approach of using the average realized return over long periods gives too high an answer.

Q12. What is your conclusion regarding the MRP?

A12. Estimation of the MRP remains controversial. There is no consensus on its value nor even how to estimate it. Given all of the information, I estimate the risk premium for average risk stocks to be 8.0 percent over Treasury bills and 6.5 percent over long-term Government bonds.

[19] Ibbotson Associates SBBI Valuation Edition 2005 Yearbook, Appendix A.

C. RELATIVE RISK

Q13. How do you measure relative risk?

A13. The risk measure I examine is the "beta" of the stocks in question. Beta is a measure of the "systematic" risk of a stock — the extent to which a stock's value fluctuates more or less than average when the market fluctuates.

Q14. Please explain beta in more detail.

A14. The basic idea behind beta is that risks that cannot be diversified away in large portfolios matter more than those that can be eliminated by diversification. Beta is a measure of the risks that *cannot* be eliminated by diversification.

Diversification is a vital concept in the study of risk and return. (Harry Markowitz won a Nobel Prize for work showing just how important it was.) Over the long run, the rate of return on the stock market has a very high standard deviation, on the order of 15 - 20 percent per year. But many individual stocks have much higher standard deviations than this. The stock market's standard deviation is "only" about 15 - 20 percent because when stocks are combined into portfolios, some of the risk of individual stocks is eliminated by diversification. Some stocks go up when others go down, and the average portfolio return — positive or negative — is usually less extreme than that of individual stocks within it.

In the limiting case, if the returns on individual stocks were completely uncorrelated with one another, the formation of a large portfolio of such stocks would eliminate risk entirely. That is, the market's long-run standard deviation would be not 15 - 20 percent per year, but virtually zero.

The fact that the market's actual annual standard deviation is so large means that, in practice, the returns on stocks *are* correlated with one another, and to a material degree. The reason is that many factors that make a particular stock go up or down also affect other stocks. Examples include the state of the economy, the balance of trade, and inflation. Thus some risk is "non-diversifiable". Single-factor equity risk premium models derive conditions in which all of these factors can be considered simultaneously, through their impact on the market portfolio. Other models derive somewhat less restrictive conditions under which several of them might be individually relevant.

Again, the basic idea behind all of these models is that risks that cannot be diversified away in large portfolios matter more than those that can be eliminated by diversification, because there are a large number of large portfolios whose managers actively seek the best risk-reward tradeoffs available. Of course, undiversified investors would like to get a premium for bearing diversifiable risk, but they cannot.

Q15. Why not?

A15. Well-diversified investors compete away any premium rates of return for diversifiable risk. Suppose a stock were priced especially low because it had especially high diversifiable risk. Then it would seem to be a bargain to well diversified investors. For example, suppose an industry is subject to active competition, so there is a large risk of loss of market share. Investors who held a portfolio of all companies in the industry would be immune to this risk, because the loss on one company's stock would be offset by a gain on another's stock. (Of course, the competition might make the whole industry more vulnerable to the business cycle, but the issue here is the diversifiable risk of shifts in market share among firms.)

If the shares were priced especially low because of the risk of a shift in market shares, investors who could hold shares of the whole industry would snap them up. Their buying would drive up the stocks' prices until the premium rates of return for diversifiable risk were eliminated. Since all investors pay the same price, even those who are not diversified can expect no premium for bearing diversifiable risk.

Of course, substantial non–diversifiable risk remains, as the October Crash of 1987 demonstrates. Even an investor who held a portfolio of all traded stocks could not diversify against that type of risk. Sensitivity to such market–wide movements is what beta measures. That type of sensitivity, whether considered in a single- or multi-factor model, determines the risk premium in the cost of equity.

Q16. What does a particular value of beta signify?

A16. By definition, a stock with a beta equal to 1.0 has average non-diversifiable risk: it goes up or down by 10 percent on average when the market goes up or down by 10 percent. Stocks with betas above 1.0 exaggerate the swings in the market: stocks with betas of 2.0 tend to fall 20 percent when the market falls 10 percent, for example. Stocks with betas below 1.0 are less volatile than the market. A stock with a beta of 0.5 will tend to rise 5 percent when the market rises 10 percent.

Q17. How is beta measured?

A17. The usual approach to calculating beta is a statistical comparison of the sensitivity of a stock's (or a portfolio's) return to the market's return. Many investment services report betas, including Merrill Lynch's quarterly *Security Risk Evaluation* and the *Value Line Investment*

Survey. Betas are not always calculated the same way, and therefore must be used with a degree of caution, but the basic point that a high beta indicates a risky stock has long been widely accepted by both financial theorists and investment professionals.

Q18. Are there circumstances when the "usual approach" should not be used?

A18. There are at least two cases where the standard estimate of beta should be viewed skeptically.

First, companies in serious financial distress seem to "decouple" from their normal sensitivity to the stock market. The stock prices of financially distressed companies tend to change based more on individual news about their particular circumstances than upon overall market movements. Thus, a risky stock could have a low estimated beta if the company was in financial distress. Other circumstances that may cause a company's stock to decouple include an industry restructuring or major changes in a company's supply or output markets.

Second, similar circumstances seem to arise for companies "in play" during a merger or acquisition. Once again, the individual information about the progress of the proposed takeover is so much more important for that stock than day-to-day market fluctuations that, in practice, beta estimates for such companies seem to be too low.

Q19. How reliable is beta as a risk measure?

A19. Scholarly studies have long confirmed the importance of beta for a stock's required rate of return. It is widely regarded as the best single risk measure available. The merits of beta seemed to have been challenged by widely publicized work by Professors Eugene F. Fama and

Kenneth R. French.[20] However, despite the early press reports of their work as signifying that "beta is dead," it turns out that beta is still a potentially important explanatory factor (albeit one of several) in their work. Thus, beta remains alive and well as the best single measure of relative risk.

D. INTEREST RATE FORECAST

Q20. What interest rates do your procedures require?

A20. Modern capital market theories of risk and return use the short-term risk-free rate of return as the starting benchmark. My measures of the MRP incorporate this approach, since they represent the excess of the expected return on the market over the 30-day U.S. Treasury bill rate and over the long-term U.S. Government bond rate. Accordingly, implementation of my procedures requires use of a forecast of the 30-day Treasury bill rate and the long-term Government bond rate.

E. COST OF CAPITAL MODELS

Q21. How do you combine the above components into an estimate of the cost of capital?

A21. By far the most widely used approach to estimation of the cost of capital is the "Capital Asset Pricing Model," and I do calculate CAPM estimates. However, the CAPM is only one equity risk premium approach technique, and I also use another.

[20] See for example, "The Capital Asset Pricing Model: Theory and Evidence", Eugene F. Fama and Kenneth R. French, University of Chicago Working Paper, June 2004.

Q22. Please start with the CAPM, by describing the model.

A22. As noted above, the modern models of capital market equilibrium express the cost of equity as the sum of a risk-free rate and a risk premium. The CAPM is the longest-standing and most widely used of these theories. The CAPM states that the cost of capital for investment I (*e.g.*, a particular common stock) is given by the following equation:

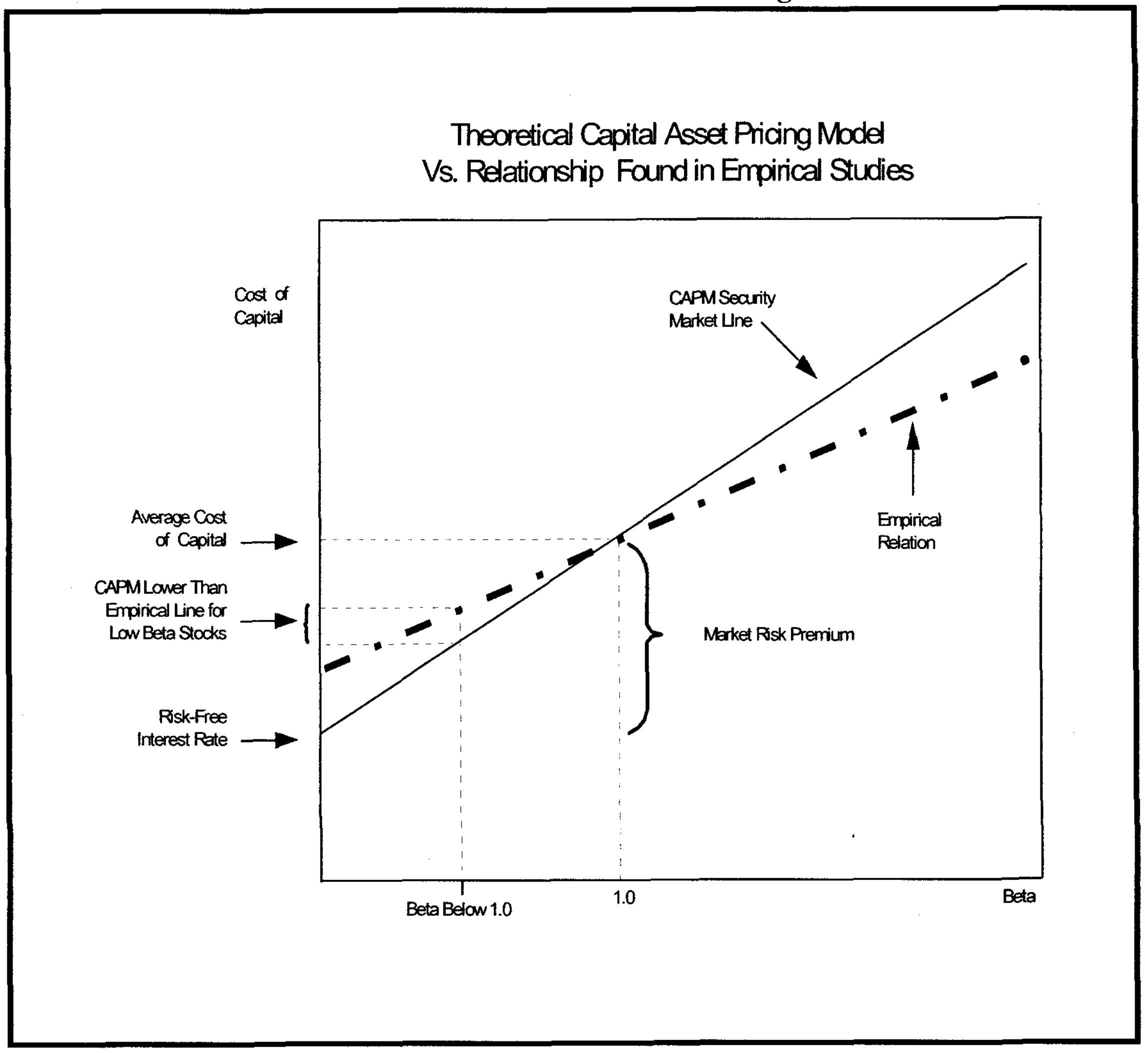
$$k_i = r_F + \beta_i \times \text{MRP} \qquad \textbf{(B-1)}$$

where k_i is the cost of capital for investment *I*; β_i is the beta risk measure for the investment *I*; and MRP is the market risk premium. The CAPM relies on the empirical fact that investors price risky securities to offer a higher expected rate of return than safe securities do. It says that the security market line starts at the risk-free interest rate (that is, that the return on a zero-risk security, the y-axis intercept in Figure 1 in the body of my testimony, equals the risk-free interest rate). It further says that the risk premium over the risk-free rate equals the product of beta and the risk premium on a value-weighted portfolio of all investments, which by definition has average risk.

Q23. What other equity risk premium approach model do you use?

A23. Empirical research has long shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premia than predicted by the CAPM and high-beta stocks tend to have lower risk premia than predicted. A number of variations on the original CAPM theory have been proposed to explain this finding. The difference between the CAPM and the type of relationship identified in the empirical studies is depicted in Figure B-1.

Figure B-1



The second model makes use of these empirical findings. It estimates the cost of capital with the equation,

$$k_i = r_F + \alpha + \beta_i \times (\text{MRP} - \alpha) \qquad \textbf{(B-2)}$$

where α is the "alpha" of the risk-return line, a constant, and the other symbols are defined as above. I label this model the Empirical Capital Asset Pricing Model, or "ECAPM." For the short-term risk-free rate models, I set alpha equal to 1, 2, and 3 percent which are values somewhat lower than that estimated empirically. For low-beta stocks such as regulated utilities, the use of a lower value for alpha leads to a lower estimate of the cost of capital. For the long-term risk-free rate models, I set alpha equal to both 0.5 percent and 1.5 percent, but I rely more heavily on the 0.5 percent results. The use of a long-term risk-free rate incorporates some of the desired effect of using the ECAPM. That is, the long-term risk-free rate version of the Security Market Line has a higher intercept and a flatter slope than the short-term risk-free version which has been tested. Thus, it is likely that I do not need to make the same degree adjustment when I use the long-term risk-free rate. A summary of the empirical evidence on the magnitude of alpha is provided in Table No. MJV-B1.

II. EMPIRICAL EQUITY RISK PREMIUM RESULTS

Q24. How is this part of the appendix organized?

A24. This section presents the full details of my equity risk premium approach analyses, which are summarized in the body of my testimony. This section discusses the sample selection process, calculation of the market value capital structures, and the forecasts of the short-term and the long-term risk-free interest rates. Next, it addresses the beta estimates, and the estimates of the MRP I use in the models. Finally, it reports the CAPM and ECAPM results for the samples' costs of equity, and then describes the results of adjusting for differences between the samples' and Paradise Valley Water Company's ("Paradise Valley") capital structures.

A. PRELIMINARY MATTERS

1. WATER UTILITY SAMPLE

Q25. How do you select your water utility sample companies?

A25. The overall cost of capital for a part of a company depends on the risk of the business in which the *part* is engaged, *not* on the overall risk of the parent company on a consolidated basis. According to financial theory, the overall risk of a diversified company equals the market value weighted-average of the risks of its components.

Estimating the cost of capital for Paradise Valley's regulated assets is the subject of this proceeding. The ideal sample would be a number of companies that are publicly traded "pure plays" in the water production, storage, treatment, transmission and distribution line of business. "Pure play" is an investment term referring to companies with operations only in one line of business. Publicly traded firms, firms whose shares are freely traded on stock exchanges, are ideal because the best way to infer the cost of capital is to examine evidence from capital markets on companies in the given line of business.

To construct this sample, I started with the universe of companies classified as water utility companies in *Value Line*.[21] Normally, I would apply several selection criteria to eliminate companies with unique circumstances that may affect the cost of capital estimates. For example, I would normally eliminate companies with low annual revenues, no or low bond ratings, lack of IBES or Compustat data, and all companies with announced dividend cuts or that were involved in significant merger activity over the last five years (2000 to today). However, applying my standard procedures to the eight companies followed by *Value Line* would result in a sample of at most two companies. I therefore use all eight companies in my analysis. I report results for both the full sample and for a subsample without Southwest Water Company and York Water Co. because Southwest Water Company earns a relatively low (less than 40%) of its revenue from regulated water utility activities and because York Water Co. has numerous data problems. Companies in the subsample earned at least 86 percent of their revenue from regulated water utility activities in 2004.

Table No. MJV-2 reports operating revenue shares from different lines of business in 2004 for these companies. (Table No. MJV-1 provides an index to the other tables.)

Q26. Why do you usually eliminate companies currently involved in a merger from your samples?

A26. The stock prices of companies involved in mergers are often more affected by news relating to the merger than to movements in the stock market. In other words, the stock price "decouples" from its normal relationship to the stock market (the economy) which is the basis

[21] Including both the Standard and the Small and Mid-Cap Editions of *Value Line Investment Survey and Value Line Investment Survey - Plus Edition..*

upon which a company's relative risk is calculated. Instead the stock price of a merger candidate is more affected by the latest speculation on the terms and probability of the merger.

Q27. What are the water sample's data problems?

A27. First, of the eight companies followed by *Value Line*, three companies (Connecticut Water, Middlesex Water, and York Water) have 2004 revenues below $100 million. The stock of small companies frequently exhibit "thin trading" which means that their stock trades infrequently. During 2004, three companies (Connecticut Water, SJW Corp., and York Water) had an average trading volume of less than 10,000 shares per day. As a result, the measured beta is likely to be downward biased. Of the four companies with 2004 revenues above $100 million and an average trading volume in excess of 10,000 shares per day, one lacks a bond rating for the most recent five years, and I have not found a bond rating for several others for some years (see Workpaper #1 to Table No. MJV-10 for details).

Second, several companies lack long-term earnings forecasts. I do not include Connecticut Water Service Inc. and SJW Corp. in the sample when applying the forward-looking Discounted Cash Flow ("DCF") method because of a lack of recent earnings forecasts. However, I do include both Connecticut Water and SJW Corp. in the risk positioning method. Of the six companies included in the DCF method, two have only one analyst providing a long-term earnings forecast.

Third, only two companies have significant revenue, a bond rating and more than one long-term growth forecast and among those, one has only one long-term IBES earnings forecast.

Fourth, many companies have significant merger activity over the last five years. Philadelphia Suburban (renamed Aqua America) completed the acquisition of AquaSource for about $195 million in July 2003, and during 2004 Aqua America completed 29 acquisitions. Additionally, American Water Works acquired National Enterprises, Inc., Azurix, and the water and wastewater utility assets of Citizens Utilities. American Water Works, in turn, was acquired by the RWE AG on January 10, 2003. Domestic energy companies have also invested in the water utility business, although presently many of those investments have or will be sold. Allete has sold its assets in Florida and North Carolina; Indianapolis Water Company was sold by NISource; Suez Lyonnaise des Eaux purchased the remaining shares of United Water Resource that it did not already own; and Thames Water purchased E'Town Corporation. California Water Services purchased Ka'anpali Water Corporation in 2003 and Southwest Water Co. acquired a Texas utility consisting of 86 water systems and 11 wastewater systems in 2004. [22] York Water has recently acquired two small water utilities.[23]

These factors may all potentially affect the cost of equity estimates in not completely predictable ways. Because of the substantial data problems and lack of publicly traded water utilities, I am forced to rely on a sample with significant data problems or a sample with at most two companies (American States Water and California Water Services).[24]

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[22] Sources: *Value Line Investment Survey*, January 30, 2004 and January 28, 2005, *The Business Journal*, *http://ir.calwatergroup.com*, and company web sites.

[23] Press releases, March 1 and March 21, 2005.

[24] Several companies have multiple problems. For example, Connecticut Water has revenues below $100 million, exhibits thin trading and and lacks long-term earnings growth forecasts. Middlesex Water has revenues below $100 million, only one IBES forecast and no long-term *Value Line* earnings forecast. SJW Corp. exhibits thin trading, has no current IBES forecasts and lacks a bond rating. Southwest Water earned only 37% of its revenues from regulated activities and has no long-term *Value Line* forecast. York Water has revenues below $100 million, exhibits thin trading, has only one IBES forecast and no long-term value line forecast. In addition York Water has recently acquired two small local utilities.

2. GAS LOCAL DISTRIBUTION COMPANY SAMPLE

Q28. How do you select your gas local distribution company sample?

A28. To select this sample, I started with the universe of publicly traded gas distribution utilities covered by *Value Line*. This resulted in an initial group of 16 companies.[25] I then eliminated companies by applying additional selection criteria designed to eliminate companies with unique circumstances which may bias the cost of capital estimates. The final sample consists eight gas local distribution ("gas LDC") companies. Table No. MJV-13 reports operating revenue shares from regulated activities for these companies for the period 2000-2004.

Q29. What are the selection criteria you applied?

A29. I eliminated all companies whose regulated revenues are not greater than 50 percent of total revenues because one goal for this sample was for the sample companies to derive the majority of their revenues from regulated activities. I also eliminated all companies whose bond rating was less than Baa- as rated by Moody's and companies that had a large merger during the period January 2001 to March 2005. The screen for merger activity is any mention of merger activity in the analyst report section of *Value Line* or sizeable mergers found during a search of the companies' web pages.[26,27] To guard against measurement bias caused by "thin trading," I also restricted the sample to companies with total operating revenues greater than $300

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[25] The 16 companies are from *Value Line Investment Survey's* Standard Edition.

[26] Company web pages were searched in December 2003 for merger and acquisition activities during the 2001-2003 period and in April 2005 for merger and acquisition activities during the period 2004 through March 2005.

[27] For purposes of sample selection, a sizeable merger is defined to be one which would exceed 25 percent of the total capitalization of the company at the time of the merger announcement.

million in 2004 and a market value in excess of $150 million as reported by *Value Line*.[28] Finally, I require that the companies have historical monthly return data available from Compustat for the relevant period.

Q30. What companies were eliminated from the gas LDC sample because their share of revenue from distribution activities is not above 50 percent?

A30. New Jersey Resources was eliminated from the sample because its revenue share from natural gas distribution is not above 50%. Additionally, the percentage of its income from marketing and other wholesale activities increased by 25 percent in 2004.[29]

Q31. Were any other companies eliminated?

A31. Yes. AGL Resources, Atmos Energy, Piedmont Natural Gas and Southern Union were eliminated for recent or current merger activities. Semco Energy was eliminated because of its non-investment grade bond rating from Moody's. Nicor Inc. was eliminated from the sample because of its restatement of earnings for 1999-2001, and because Nicor settled regulatory compliance issues with the Federal Energy Regulatory Commission ("FERC") in 2003.[30] UGI Corp. was eliminated because it primarily sells propane which is non-regulated.

Q32. Are there any issues with remaining companies in your sample?

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[28] As reported by *Value Line* on March 18, 2005.

[29] *Value Line Investment Survey*, Natural Gas (Distribution), March 18, 2005.

[30] Nicor announced on Oct. 29, 2002 that its earnings for 1999-2001 would be revised downwards by $15-35 million. March 4, 2003, Nicor released its restated earnings for 1999-2001 along with 2002 earnings.

A32. Perhaps. South Jersey Industries reported revenue from energy trading activities in its 2001 10-K. Given the turmoil of the energy trading markets, the companies' cost of capital estimates may be more volatile than those of more stable companies. Additionally, KeySpan and WGL Holdings have obtained on average less than 70 percent of their revenues from regulated activities during the past five years and Peoples Energy obtained less than 70 percent of its revenues from regulated activities in 2004.

Because of concerns with some companies in the sample, I report results for a subsample that consists only of those companies that have earned at least 70 percent of their revenue from regulated activities during the relevant period.[31]

Q33. Please compare the characteristics of the water utility sample and the gas LDC sample.

A33. Both samples earned a large percentage of their revenue from regulated activities and serve a mix of residential, industrial, and other customers. However, the gas LDC sample has fewer of the data and estimation issues identified above for the water sample. The following summarizes the water utility and the gas LDC samples' characteristics in terms of being "pure regulated utilities and low risk" companies. I summarize the characteristics for both the full sample and for the subsamples. The subsamples have a higher percent of their revenues from regulated utilities, and the water subsample is further restricted to companies with fewer data problems. Companies in the water utility subsample earned at least 86 percent of revenues from regulated activities in 2004 while companies in the gas LDC subsample earned at least 70 percent of revenue from regulated activities. (See Tables No. MJV-2 and No. MJV-13).

[31] For the DCF analysis, companies in the subsample earned at least 70 percent of their revenue from regulated activities in 2004 and for the risk positioning analysis, companies in the subsample earned an average of at least 70 percent of their revenue from regulated activities during the past five years.

All companies in the water utility sample and the gas LDC sample are regulated by one or more states. Also, companies in both the water utility and the gas LDC sample have significant investments in water or gas networks and serve a mix of residential, industrial, commercial, and public customers, i.e., their customer mix is comparable.

To determine the risk characteristics of the gas LDC sample, I reviewed several key features of their regulatory environment. Most if not all companies have a fuel adjustment clause that allows them to pass (at least part of) increases in gas purchase costs onto their customers. Some gas LDC companies have tariffs that contain provisions that permit the recovery of (some) environmental remediation costs. Such provisions exist for, for example, KeySpan and South Jersey Industries.[32] All LDC companies discuss environmental clean-up requirements and five of the eight companies indicate in their 10-K reports that it might significantly and negatively affect their future performance. Note that most of the gas LDC's are subject to some retail competition (half of the companies in both the full sample and the subsample).[33] Regulatory requirements from federal and local authorities through, for example, the Clean Water Act of 1974 and EPA enforcement, will likely require the water industry to invest substantial amounts in infrastructure going forward.[34]

Q34. What do you conclude from the comparison of the water utility and the gas LDC samples?

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[32] KeySpan, 2004 10-K, p. 145 and South Jersey Industries, 2004 10-K, p. 6. South Jersey is included in the 'clean' subsample but KeySpan is not.

[33] Any company located in a state with a de-regulation rating of 1 or 2 per the U.S. Energy Information Administration. See Table No. MJV-13.

[34] According to *Value Line Investment Survey*, Water Utility Industry, January 28, 2005, updates to the infrastructure of water utilities are likely to grow into hundreds of billions of dollars over the next decade or two.

A34. The two samples differ primarily in that they operate in two different (regulated) industries, but they are very similar in terms of the percentage of revenues from regulated operations and the customers they serve. The gas LDC sample provides a reasonable comparison sample for the water utility industry but without the substantial data issues.

3. OTHER PRELIMINARY MATTERS

Q35. What capital structure information do you require?

A35. For reasons discussed in my testimony and explained in detail in *Section IV* of Dr. Kolbe's testimony explicit evaluation of the market-value capital structures of the sample companies versus the capital structure used for rate making is vital for a correct interpretation of the market evidence. This requires estimates of the market values of common and preferred equity and debt, and the current market costs of preferred equity and debt.

Q36. How do you calculate the market-value capital structures of the sample companies?

A36. I estimate the capital structure for each company by estimating the market values of common equity, preferred equity and debt from publicly available data. The calculations are in Panels A to H of Tables No. MJV-3 and MJV-14 for the water and gas LDC sample, respectively.

The market value of equity is straightforward: the price per share times the number of shares outstanding. The market value of debt is set equal to its book value because the market value of debt generally does not differ materially from its book value at this time. The market value of preferred equity is also set equal to its book value because preferred equity makes up a very small portion (less than 1 percent) of the market value capital structures of the companies in the two samples.

For purposes of assessing financial risk to common shareholders, I add an adjustment for short-term debt to the debt portion of the capital structure. This adjustment is used only for those companies whose short-term (current) liabilities (net of the current portion of long-term debt) exceed their short-term (current) assets. I add an amount equal to the minimum of the difference between short-term liabilities and short-term assets or the amount of short-term debt. The reason for this adjustment is to recognize that when current liabilities exceed current assets, a portion of the companies long-term assets are being financed, in effect, by short-term debt. The output of these schedules is the market debt-to-value and preferred equity-to-value ratios. Table No. MJV-3 and Table No. MJV-14 report such calculations using the values at year end for the years 2000 - 2004. The overall cost of capital calculation for the risk positioning estimates rely on the average of the market value capital structure computed for the years 2000 through 2004. The DCF capital structure uses stock prices as of April, 2005 and balance sheet information for year-end 2004.

Q37. How do you estimate the current market cost of debt?

A37. I use the current yields on indices of comparably rated utility bonds. The cost of debt for each company in the DCF analysis is the current yield reported by *Mergent Bond Record* for an index of bonds rated comparably by Moody's. For the risk positioning method, the cost is the current yield corresponding to the five-year average debt rating for each company. The debt ratings for the companies in both samples are obtained from *Moody's* (www.moodys.com and, for some water utilities from Standard and Poor's).[35] Calculation of the after-tax cost of debt uses the Company's estimated marginal income tax rate for 2005 of 39.529 percent.

[35] See Workpaper #1 to Table No. MJV-10 for details.

Q38. How do you estimate the current market cost of preferred equity?

A38. The cost of preferred equity is estimated similarly to the cost of debt. It is set equal to the yield on an index of comparably rated preferred equity. The preferred equity is rated by Moody's.[36]

B. RISK-FREE INTEREST RATE FORECAST

Q39. How do you obtain the forecasts of the risk-free interest rates over the period the utility rates set here are to be in effect?

A39. I understand that the period for which these rates will be in effect begins 13 months after the rate case filing which would be approximately June 2006. Therefore, the equity risk premium approach calculations require a forecast of short-term and long-term Government yields for that period.

I obtain these forecast rates from the website of the St. Louis Federal Reserve Bank. In particular, I use the yields from the "constant maturity series". This information is displayed in Table No. MJV-12, Panel A.

Q40. What values do you use for the short-term and long-term risk-free interest rates?

A40. I use a value of 3.0 percent for the short-term risk-free interest rate and a value of 5.0 percent for the long-term risk-free interest rate as the benchmark interest rates in the equity risk premium analyses for the reasons discussed in the testimony.

[36] If no preferred rating was found, the preferred rating is assumed to be equal to the company's bond rating.

C. BETAS AND THE MARKET RISK PREMIUM

1. BETA ESTIMATION PROCEDURES

Q41. How do you calculate beta?

A41. My standard approach is to calculate beta by statistical regression of the excess (positive or negative) of the return on the stock over the risk-free rate against the excess of the return on the S&P 500 index over the risk-free rate for the most recent 60-month period for which data exist.

Q42. Did you use your standard approach to calculate betas for this proceeding?

A42. No. Ordinarily, I estimate betas based upon the most recent 60 months of data for the sample companies, but the turmoil and unusual events in the stock market makes the most recent 60 month period unsuitable to estimate the sample companies betas. These events have caused the returns of the companies in the two samples to "decouple" from their normal relationship to the returns on the market index. I believe that the risk of the sample companies has increased given the changes in the natural gas market and in the water industry, but betas estimated over the most recent 60 month period have fallen dramatically for both samples from estimates based upon data from only a few years earlier. Several of the sample companies' estimated betas were very close to zero and some were even negative for the most recent 60 month period. A zero beta implies a risk-free asset, but I don't believe that these sample companies are risk-free. These results caused me to question of the validity of my beta estimates for the samples.

Q43. In light of decoupling discussed above, how do you estimate the betas for your sample companies?

A43. I use betas estimated by *Value Line.* Because *Value Line* reports adjusted betas, I test for interest rate sensitivity in the returns of the sample companies. I use adjusted betas to compensate for interest rate sensitivity for companies regulated on the basis of original cost rate base, because unadjusted betas underestimate the cost of capital for interest sensitive stocks. However, in this case, the sample companies do not exhibit statistically significant sensitivity to interest rate changes in either sample. I, therefore, reverse the adjustment procedure to provide unadjusted beta values.

Q44. Please explain how you test for interest rate sensitivity.

A44. Under traditional regulation, utilities are more sensitive to interest rate changes than are unregulated companies because utilities are regulated with nominal rates of return on historical-cost rate bases. Shareholders of companies regulated on a book-value rate base receive compensation for inflation in a different way from most companies' shareholders, through an inflation premium in the rate of return rather than through appreciation of asset value. Bondholders get inflation compensation in the same way, through an inflation premium in the interest rate. This similarity makes regulated company returns especially sensitive to fluctuations in the bond market. This in turn affects the estimation of such a company's beta, the stock market measure of risk. Betas measured in the conventional way do not capture the regulated firms' extra sensitivity to interest rates.[37] To measure interest rate sensitivity, I

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[37] For details on this, see Charles River Associates, *Choice of Discount Rates in Utility Planning: A Critique of Conventional Betas as Risk Indicators for Electric Utilities*, prepared for the Electric Power Research Institute, (continued...)

estimate a two factor model where the second factor is a pure bond residual. The pure bond residual is determined as the difference between the realized bond yield and the yield predicted by a regression of bond yields on the stock market. If the regression coefficient on the pure bond residual in the two-factor model is statistically significant, the firm exhibits interest rate sensitivity. Neither the water sample nor the gas LDC sample companies currently exhibit statistically significant interest rate sensitivity on average. It is for this reason that I use unadjusted betas in my analysis.

Q45. Please review the Merrill Lynch beta adjustment procedure and the reason for using it.

A45. Merrill Lynch reports two types of beta, one calculated essentially as just described and one adjusted to compensate for sampling errors in directly estimated betas. The Merrill Lynch adjustment moves betas one-third of the way toward a value of one, the average stock beta. The adjustment is designed as a correction for the tendency of companies with low estimated betas to have negative sampling errors and for the tendency of companies with high estimated betas to have positive sampling errors.

Many practitioners routinely use Merrill Lynch adjusted betas to adjust for sampling error, but that is not the reason I use adjusted betas. As noted above, I normally use adjusted betas to compensate for the interest sensitivity of companies regulated on the basis of original cost rate base. The use of unadjusted betas is appropriate for estimating the cost of capital for industries other than utilities regulated on the basis of original cost rate base or for companies

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[37] (...continued)
February, 1984. A. Lawrence. Kolbe was a principal investigator on this study, along with James A. Read, Jr.

that do not demonstrate interest rate sensitivity. Because neither sample currently exhibits statistically significant interest rate sensitivity at this time, I use unadjusted betas.

Q46. What beta values do you use in your analysis?

A46. After reversing the adjustment process discussed above, the current estimated *Value Line* betas range from 0.30 to 0.60 for the water sample and from the 0.30 to 0.67 for the gas LDC sample (See Workpaper #1 to Tables No. MJV-9 and No. MJV-20). For both samples the average beta value is very close to the average value for the period prior to the recent decline in estimated betas using 60 months as the estimation period. The fact that *Value Line*'s beta estimates have remained relatively stable is evidence that *Value Line* does not believe that the risk of the sample companies has suddenly decreased.[38]

Q47. Do you have any additional support for the betas that you use in your analysis?

A47. Yes. Additional evidence on the current value of the betas is provided by estimates based on weekly return data instead of monthly return data. Using the most recent 52 weeks of data avoids much of the period of stock market turmoil that significantly affects the 60-month beta estimates. I have calculated 52-week beta estimates for the water and gas LDC sample companies. The average reported as of April 13, 2005 is 1.01 for the water sample, which is significantly higher than the unadjusted beta estimates of .46 to .52 I rely on for the water sample. (Workpaper #1 to Table No. MJV-9) For the gas LDC sample, the 52-week sample

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[38] During the past year, *Value Line* has increased its beta estimates for both the water and gas LDC samples by an average of approximately 0.05 (See Workpaper #1 to Tables No. MJV-9 and MJV-20).

average beta is 1.00, also significantly higher than the 0.53 to 0.58 average of the beta estimates I use in my analysis. (Workpaper #1 to Table No. MJV-20).

Although I do not use the beta estimates based on 52 weeks of data, the estimates are evidence that the risk of the sample companies is higher than is reflected in betas I use in the analyses.

2. MARKET RISK PREMIUM ESTIMATION

Q48. Given all of the evidence, what MRP do you use in your analysis?

A48. It is clear that market return information is volatile and difficult to interpret, but based on the collective evidence, the MRP I use for the short-term risk-free rate is 8 percent and for the long-term risk-free rate is 6.5 percent.

D. COST OF CAPITAL ESTIMATES

Q49. Based on these data, what are the values you calculate for the overall cost of capital and the corresponding cost of equity for the water utility sample?

A49. Panels A and B of Table No. MJV-9 present the cost of equity results using the equity risk positioning method at the sample companies' market value capital structures. The table contains two panels, Panel A for the long-term risk-free rate and Panel B for the short-term risk-free rate.

Q50. What does the water utility sample market data imply about cost of equity at Paradise Valley's 36.7 percent equity ratio?

A50. The return on equity and the overall cost of capital for the various equity risk positioning methods are reported in Table No. MJV-10, Panels A to G. Panels A through C utilize the long-term risk-free rate while Panels D through G use the short-term risk free rate. Panel A reports the CAPM results using the long-term risk-free rate, while Panels B and C report the ECAPM cost of equity results for the ECAPM parameters of 0.5 and 1.5 percent, respectively. Panel D reports the CAPM estimates using the short-term risk free rate. Panels E, F and G report ECAPM results using ECAPM parameters of 1, 2 and 3 respectively. Focusing on the middle version of the ECAPM, Panel B of Table No. MJV-10 (ECAPM with a = 0.5%) shows the results using the long-term risk-free rate version of the model. For this table, the costs of equity for the water sample range from 7.3 to 9.1 percent for capital structures that average 67 percent equity. The sample average ATWACC is 6.6 percent for the full sample and 6.7 percent for the subsample.

In each panel, column eight reports the overall cost of capital for each company. The last two rows of each panel report the sample averages. The first is for all companies in the water sample (average [a]), and the second is for the subsample of companies with significant revenue from regulated water activities and fewer data problems (average [b]). The sample average ATWACCs from each panel of Table No. MJV-10 are reproduced in column one of Table No. MJV-11 which reports the cost of equity estimates for each of the risk positioning estimates that is consistent with the sample information and the capital structure of Paradise Valley. Panel A of Table No. MJV-11 reports the results for all sample companies. Panel B of the table summarizes the results for the subsample of companies that have a large percentage of revenues from regulated activities and fewer data problems. The sample average

ATWACCs and corresponding costs of equity at a 36.7 percent equity ratio are also displayed in Table 1 of my testimony.

Q51. What cost of equity values do you calculate for the gas LDC sample?

A51. The cost of equity estimates for the gas LDC sample are displayed on Panels A and B of Table No. MJV-20. Panel A uses the long-term risk-free rate, and Panel B uses the short-term risk-free rate.

Q52. What does the gas LDC sample market data imply about the cost of equity at Paradise Valley's 36.7 percent equity ratio?

A52. The cost of equity and the overall cost of capital for the various equity risk positioning methods are reported in Table No. MJV-21 for the gas LDC sample. Panels A through C utilize the long-term risk-free rate. Panel A again reports the CAPM cost of equity results while Panels B and C report the ECAPM cost of equity results for the 0.5 and 1.5 percent adjustment factors, respectively. Panels D through G to Table MJV-21 utilize the short-term risk-free rate. Panel D report the CAPM cost of equity results, while Panels E, F and G report the ECAPM overall cost of capital results using 1, 2 and 3 percent adjustment factors. In each panel, column eight reports the overall cost of capital for each company. The last two lines of each panel report the sample averages for the full sample and the subsample of companies with an average of more than 70 percent of revenue for the last five years from regulated activities.

Panel B of Table No. MJV-21 shows the estimates using the middle version of the ECAPM (a = 0.5%) for the companies in the gas LDC sample. Using the long -term risk-free rate, the model results in costs of equity of 7.3 to 9.5 percent for capital structures that average about 57 percent equity. The full sample average ATWACC for both samples is 6.6 percent, but the sample average cost of equity is higher for the gas LDC which is consistent with the increased financial leverage in the LDC sample (57% equity) compared to the water sample (66 to 67% equity). The result is that the cost of equity at the Paradise Valley's 36.7% equity thickness is comparable for both samples using all companies.[39] The results for the water subsample are slightly higher than for the full sample which suggests that the estimates for the full sample are slightly downward biased. The gas LDC subsample's ATWACC results are 10 to 20 basis points lower than the full sample.

The sample average ATWACC from each panel of Table No. MJV-21 is reproduced in column one of Table No. MJV-22 which reports the cost of equity estimates for each of the risk positioning estimates. Panel A reports the results for all sample companies. As with the water sample, Panel B reports the averages using only those companies that have a large percentage of revenue from regulated activities. The sample average ATWACCs and corresponding costs of equity at a 36.7 percent equity ratio are displayed in Table 3 of my testimony.

I discuss the implications of the equity risk positioning results in the main body of my testimony.

[39] The difference between the estimated cost of equity of 12.2 percent for the full water sample compared to 12.0 percent for the full gas LDC sample is due to rounding. The ATWACC of the full water sample is 6.620 while the ATWACC of the gas LDC sample is 6.563 percent.

Table No. MJV-B1

Empirical Evidence on the Alpha Factor in ECAPM

Author	Range of alpha	Period relied upon
Fischer (1993)	–3.6% to 3.6%	1931-1991
Fischer, Jensen and Scholes (1972)	-9.61% to 12.24%	1931-1965
Fama and McBeth (1972)	4.08% to 9.36%	1935-1968
Fama and French (1992)	10.08% to 13.56%	1941-1990
Litzenberger and Ramaswamy (1979)	5.32% to 8.17%	
Litzenberger, Ramaswamy and Sosin (1980)	1.63% to 5.04%	1926-1978
Pettengill, Sundaram and Mathur (1995)	4.6%	

Sources:

Black, Fischer, "Beta and Return," *The Journal of Portfolio Management*, Fall 1993, 8-18.

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Litzenberger, Robert H. and Krishna Ramaswamy and Howard Sosin, "On the CAPM Approach to Estimation of a Public Utility's Cost of Equity Capital," *The Journal of Finance*, Vol. 35, No. 2, May 1980, pp. 369-387.

Pettengill, Glenn N., Sridhar Sundaram and Ike Mathur, "The Conditional Relation between Beta and Returns," *Journal of Financial and Quantitative Analysis*, Vol. 30, No. 1, March 1995, pp. 101-116.

Appendix C: DISCOUNTED CASH FLOW METHODOLOGY: DETAILED PRINCIPLES AND RESULTS

TABLE OF CONTENTS

Q1. What is the purpose of this appendix?

A1. This appendix reviews the principles behind the discounted cash flow or "DCF" methodology and the details of the cost of capital estimates obtained from this methodology. This appendix intentionally repeats portions of my direct testimony, because I want the reader to have access here to a full discussion of the issues addressed, rather than having to continually turn back to the corresponding section of the testimony.

I. DISCOUNTED CASH FLOW METHODOLOGY PRINCIPLES

Q2. How is this section of the appendix organized?

A2. The first part discusses the general principles that underlie the DCF approach. The second portion describes the strengths and weaknesses of the DCF model and why it is generally less reliable for estimating the cost of capital for the sample companies at the present time than the risk positioning method discussed in Appendix B.

A. SIMPLE AND MULTI-STAGE DISCOUNTED CASH FLOW MODELS

Q3. Please summarize the DCF model.

A3. The DCF model takes the first approach to cost of capital estimation discussed with Figure 1 in Section II-A of my testimony. That is, it attempts to measure the cost of equity in one step. The method assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow stream:

$$P = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_T}{(1+k)^T} \qquad \text{(C-1)}$$

where "P" is the market price of the stock; "D_i" is the dividend cash flow expected at the end of period i; "k" is the cost of capital; and "T" is the last period in which a dividend cash flow is to be received. The formula just says that the stock price is equal to the sum of the expected future dividends, each discounted for the time and risk between now and the time the dividend is expected to be received.

Most DCF applications go even further, and make very strong (*i.e.*, unrealistic) assumptions that yield a simplification of the standard formula, which then can be rearranged to estimate the cost of capital. Specifically, if investors expect a dividend stream that will grow forever at a steady rate, the market price of the stock will be given by a very simple formula,

$$P = \frac{D_1}{(k-g)} \qquad \text{(C-2)}$$

where "D_1" is the dividend expected at the end of the first period, "g" is the perpetual growth rate, and "P" and "k" are the market price and the cost of capital, as before. Equation C-2 is a simplified version of Equation C-1 that can be solved to yield the well known "DCF formula" for the cost of capital:

$$k = \frac{D_1}{P} + g = \frac{D_0 x (1+g)}{P} + g \qquad \text{(C-3)}$$

where "D_0" is the current dividend, which investors expect to increase at rate g by the end of the next period, and the other symbols are defined as before. Equation C-3 says that if Equation C-2 holds, the cost of capital equals the expected dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as the simple DCF model.

Q4. Are there other versions of the DCF models besides the "simple" one?

A4. Yes. If Equation C-2 does not hold, sometimes other variations of the general present value formula, Equation C-1, can be used to solve for k in ways that differ from Equation C-3. For example, if there is reason to believe that investors do *not* expect a steady growth rate forever, but rather have different growth rate forecasts in the near term (e.g., over the next five or ten years), these forecasts can be used to specify the early dividends in Equation C-1. Once the near-term dividends are specified, Equation C-2 can be used to specify the share price value at the end of the near-term (e.g., at the end of five or ten years), and the resulting cash flow stream can be solved for the cost of capital using Equation C-1.

More formally, the "multi-stage" DCF approach solves the following equation for k:

$$P = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \ldots + \frac{D_T + P_{TERM}}{(1+k)^T} \quad . \qquad \text{(C-4)}$$

The terminal price, P_{TERM} is estimated as

$$P_{TERM} = \frac{D_{T+1}}{(k - g_{LR})} \qquad \text{(C-5)}$$

where T is the last of the periods in which a near term dividend forecast is made and g_{LR} is the long-run growth rate. Thus, Equation C-4 defers adoption of the very strong perpetual growth assumptions that underlie Equation C-2 — and hence the simple DCF formula, Equation C-3 — for as long as possible, and instead relies on near term knowledge to improve the estimate of k. I examine both simple and multi-stage DCF results below.

Q5. What are the merits of the DCF model?

A5. The DCF approach is conceptually sound if its assumptions are met but can run into difficulty in practice because those assumptions are so strong, and hence so unlikely to correspond to reality. Two conditions are well-known to be necessary for the DCF approach to yield a reliable estimate of the cost of capital: the variant of the present value formula, Equation C-1, that is used must actually match the variations in investor expectations for the dividend growth path; and the growth rate(s) used in that formula must match current investor expectations. Less frequently noted conditions may also create problems.

The DCF model assumes that investors expect the cost of capital to be the same in all future years. Investors may not expect the cost of capital to be the same, which can bias the DCF estimate of the cost of capital in either direction.

The DCF model only works for companies for which the standard present value formula works. The standard formula does *not* work for options (*e.g.*, puts and calls on common stocks), and so it will not work for companies whose stocks behave as options do. Option-pricing effects will be important for companies in financial distress, for example, which implies the DCF model will *understate* their cost of capital, all else equal.

In recent years even the most basic DCF assumption, that the market price of a stock in the absence of growth options is given by the standard present value formula (*i.e.*, by

Equation C-1 above), has been called into question by a literature on market volatility as well as the issue of the meaning of the market to book ratio discussed in Dr. Kolbe's testimony. In any case, it is still too early to throw out the standard formula, if for no other reasons than that the evidence is still controversial and no one has offered a good replacement. But the evidence suggests that it must be viewed with more caution than financial analysts have traditionally applied. Simple models of stock prices may not be consistent with the available evidence on stock market volatility.

Q6. Do you agree that estimating the right growth rate is the most difficult part for the implementation of the DCF approach?

A6. Yes. Finding the right growth rate(s) is indeed the usual "hard part" of a DCF application. The original approach to estimation of g relied on average historical growth rates in observable variables, such as dividends or earnings, or on the "sustainable growth" approach, which estimates g as the average book rate of return times the fraction of earnings retained within the firm. But it is highly unlikely that historical averages over periods with widely varying rates of inflation, interest rates and costs of capital, such as in the relatively recent past, will equal current growth rate expectations. Moreover, the constant growth rate DCF model *requires* that dividends and earnings grow at the same rate. It is inconsistent for dividends to grow at a rate that differs from the growth in earnings because it would mean that dividends are becoming an ever increasing or decreasing percentage of earnings.

Most cost of capital experts rely on earnings growth rates, not dividend growth rates, for several reasons. First, although the model is derived from dividend growth rates, the more fundamental parameter is earnings growth because dividends are paid from earnings.

Second, analyst forecasts of dividend growth rates are generally not available, but earnings growth forecasts are. Third, a better approach than relying on historical information is to use the growth rates currently expected by investment analysts, if an adequate sample of such rates is available. Analysts' forecasts are superior to time series forecasts based upon single variable historical data as has been documented and confirmed extensively in academic research.[1]

If this approach is feasible and if the person estimating the cost of capital is able to select the appropriate version of the DCF formula, the DCF method should yield a reasonable estimate of the cost of capital for companies not in financial distress and without material option-pricing effects (always subject to recent concerns about the applicability of the basic present value formula to stock prices). However, for the DCF approach to work, the basic stable-growth assumption must become reasonable and the underlying stable-growth rate must become determinable *within the period for which forecasts are available.*

Q7. What is the so called "optimism bias" in the earnings growth rate forecasts of security analysts and what is its effect on the DCF analysis?

A7. Optimism bias is related to the observed tendency for analysts to forecast earnings growth rates that are higher than are actually achieved. This tendency to over estimate growth rates is perhaps related to incentives faced by analysts that provide rewards not strictly based

[1] Lawrence D. Brown and Michael S. Rozeff, 1978, "The Superiority of Analysts Forecasts as Measures of Expectations: Evidence from Earnings," *Journal of Finance*, Vol. XXXIII, No. 1, pp. 1-16. J. Cragg and B.G. Malkiel, 1982, *Expectations and the Structure of Share Prices*, National Bureau of Economic Research, University of Chicago Press. R.S. Harris, 1986, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return," *Financial Management*, Spring 1986, pp. 58-67. J. H. Vander Weide and W. T. Carleton, 1988, "Investor Growth Expectations: Analysts vs. History," *Journal of Portfolio Management*, Spring, pp. 78-82. T. Lys and S. Sohn, 1990, "The Association Between Revisions of Financial Analysts Earnings Forecasts and Security Price Changes," *Journal of Accounting and Economics*, vol 13, pp. 341-363.

upon the accuracy of the forecasts. To the extent optimism bias is present in the analysts' earnings forecasts, the cost of capital estimates from the DCF model would be too high.

Q8. Does optimism bias mean that the DCF estimates based upon analysts' earnings forecasts are completely unreliable?

A8. No. The effect of optimism bias is least likely to affect DCF estimates for large, rate regulated companies in stable segments of an industry. Furthermore, the magnitude of the optimism bias (if any) for regulated companies is not clear. In a recent paper Chan, Karceski, and Lakonishok (2000)[2] sort companies on the basis of the size of the IBES forecasts to test the level of optimism bias. Utilities constitute 25 percent of the companies in lowest quintile, and by one measure the level of optimism bias is 4 percent. However, the 4 percent figure does not represent the complete characterization of the results in the paper. Table IX of the paper shows that the median IBES forecast for the first (lowest) quintile averages 6.0 percent. The realized "Income before Extraordinary Items" is 2.0 percent (implying a four percent upward bias in IBES forecasts), but the "Portfolio Income before Extraordinary Items" is 8.0 percent (implying a two percent downward bias in IBES forecasts).

The difference between the "Income before Extraordinary Items" and "Portfolio Income before Extraordinary Items" is whether individual firms or a portfolio are used in estimating the realized returns. The first is a simple average of all firms in the quintile while the second is a market value weighted-average. Although both measures of bias have

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[2] L. K.C. Chan, J. Karceski, and J. Lakonishok, 2003, "The Level and Persistence of Growth Rates," *Journal of Finance* 58(2):643-684.

their own drawbacks according to the authors,[3] the Portfolio Income measure gives more weight to the larger firms in the quintile such as regulated utilities. In addition, the paper demonstrates that "analysts' forecasts as well as investors' valuations reflect a wide-spread belief in the investment community that many firms can achieve streaks of high growth in earnings."[4] Therefore, it is not clear how severe the problem of optimism bias may be for regulated utilities or even whether there is a problem at all.

Finally, the two-stage DCF model also adjusts for any over optimistic (or pessimistic) growth rate forecasts by substituting the long-term GDP growth rate for the 5-year growth rate forecasts of the analysts in the years after year 5.

Q9. Please describe the two-stage DCF model you use.

A9. The two-stage model I use is presented in equation C-4 above and assumes that the long-term perpetual growth rate for all companies in the two samples is the forecast long-term growth rate of the GDP.[5] This model allows growth rates to differ for each company for each year over the next ten years before settling down to a single long-term growth rate. The growth rate for the first five years is the growth rate for years one through five as provided in analysts' reports. After year five, the growth rate is assumed to converge linearly to the GDP growth rates. In other words, the growth rate in year 6 is adjusted by 1/5th of the difference between each company's 5-year growth rate forecast and the GDP

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3 Chan, Karceski, and Lakonishok, *op. cit.*, p. 675.

4 Chan, Karceski, and Lakonishok, *op. cit.*, p. 663.

5 See Blue Chip Economic Indicators, March 10, 2005.

forecast. The growth rate in year 7 is adjusted by an additional 1/5th so that the earning growth rate pattern converges on the long-term GDP growth rate forecast.

Q10. Why do you assume that the long-term growth rate of the sample companies will converge to the long-term growth rate of GDP?

A10. Recall that the DCF model assumes that dividends grow at a constant rate literally forever. If the growth rate of earnings (and therefore, dividends) were greater than (less than) the long-term growth rate of the economy, mathematically it would mean that the company (and the industry) would become an ever increasing (or decreasing) proportion of the economy. Therefore, the most logical assumption is that the company's earnings grow at the same rate as the economy on average over the long run.

Q11. How well are the conditions needed for DCF reliability met at present?

A11. The requisite conditions for the sample companies are not fully met at this time. Of particular concern for this proceeding is the uncertainty about what investors truly expect the long-run outlook for the sample companies to be. The longest time period available for growth rate forecasts of which I am aware is five years. The long-run growth rate (*i.e.*, the growth rate after an industry settles into a steady state) drives the actual results one gets with the DCF model. Unfortunately, this implies that unless the company or industry in question is stable, so there is little doubt as to the growth rate investors expect, DCF results in practice can end up being driven by the subjective judgment of the analyst who performs the work.

Uncertainty in an industry implies that a commission may often be faced with a wide range of DCF numbers, none of which can be well grounded in objective data on true long-run growth expectations, *because no such objective data now exist.* DCF for firms or industries in flux is *inherently* subjective with regard to a parameter (the long-run growth rate) that drives the answer one gets.

In short, the unavoidable questions about the DCF model's strong assumptions cause me to view the DCF method as *inherently* less reliable than risk positioning approach described above. However, because the DCF method has been widely used in the past and in other forums when the industry's economic conditions were different from today's, I submit DCF evidence in this case. DCF estimates also serve as a check on the values provided by the risk positioning approach methods.

B. CONCLUSIONS ABOUT DCF

Q12. Please sum up the implications of this part of the appendix.

A12. The unavoidable questions about the DCF model's strong assumptions — whether the basic present value formula works for stocks, whether option pricing effects are important for the company, whether the right variant of the basic formula has been found, and whether the true growth rate expectations have been identified — cause me to view the DCF method as *inherently* less reliable than equity risk premium approach, the other approach I use.

II. EMPIRICAL DCF RESULTS

Q13. How is this part of the appendix organized?

A13. This section presents the details of my DCF analyses, which are summarized in my direct testimony. The first part describes some preliminary matters, such as sample selection, calculation of sample capital structures, and so on. Then it turns to the details of the DCF estimates themselves.

In particular, implementation of the simple DCF models described above requires an estimate of the current price, the dividend, and near-term and long-run growth rate forecasts. The simple DCF model relies only on a single growth rate forecast, while the multi-stage DCF model employs both near-term and long-run growth rate forecasts. The remaining parts of this section describe each of these inputs in turn.

A. PRELIMINARY MATTERS

Q14. In the Appendix B discussion of "preliminary matters," you discuss sample selection and the capital structure/cost of capital data you need to complete your risk premium analyses. What, if anything, is different when you use the DCF method?

A14. First, the sample companies to which the DCF approach is applied differ slightly for the water utility sample due to the availability of earnings forecasts. Note also that the timing of the market value capital structure calculations is different in the DCF method and in the equity risk premium method. The equity risk premium method relies on the average capital structure over the past five years while the DCF approach uses only current data, so the relevant market value capital structure measure is the most recent that can be calculated. This capital structure is reported in columns 1-3 of Table No. MJV-4 for the water utility sample and Table No. MJV-15 for the gas LDC sample.

B. GROWTH RATES

Q15. What growth rates do you use?

A15. For reasons discussed above, historical growth rates today are useless as forecasts of current investor expectations for the water industry or the gas LDC sample. I therefore use rates forecasted by security analysts.

The ideal in a DCF application would be a detailed forecast of future dividends, year by year well into the future, based on a large sample of investment analysts' expectations. I know of no source of such data. Dividends are ultimately paid from earnings, however, and earnings forecasts are available for a few years. Investors do not expect dividends to grow in lockstep with earnings, but for companies for which the DCF approach can be used reliably (*i.e.*, for relatively stable companies whose prices do not include the option-like values described previously), they do expect dividends to track earnings over the long-run. Thus, use of earnings growth rates as a proxy for expectations of dividend growth rates is a common practice.

Accordingly, the first step in my DCF analysis is to examine a sample of investment analysts' forecasted earnings growth rates from the Institutional Brokers Estimate System ("IBES") and from *Value Line* for both samples. Neither IBES nor *Value Line* provide analysts' forecast for all companies in the water utility sample. IBES provides a (recent) long-term growth forecast for six of the eight companies in the water utility sample. IBES does not provide recent earnings growth rates forecasts for Connecticut Water Services or SJW Corp. The consensus forecast from IBES is based on one analyst's estimate for three companies (American States Water, Middlesex Water, and York Water) and on four analyst's estimates for three companies (California Water Services, Aqua America, and Southwest Water). *Value Line* provides earnings forecasts for only three of the six companies with long-term IBES forecasts.[6] Both IBES and *Value Line* provide long-term growth rates for all companies in the gas LDC sample. IBES projected earnings growth rates for the companies in the water utility sample and the gas LDC sample are in Panel A of Workpaper #3 to Table No. MJV-5 for the water utility sample and Panel A of Workpaper #3 to Table No. MJV-16 for the Gas LDC sample. The estimated growth rates for fiscal years 2005, 2006, and 2007, respectively, are in columns 1, 2 and 3. The sixth column reports the IBES mean five-year annual earnings growth rate. Columns four and five contain the annual growth rate for the unspecified part of the five years following 2007 (*i.e.*, for 2008 and 2009) that is implied by the other four columns of growth rates. That is, if one knows the growth rates for year 1, 2 and 3, and for years 1 through 5 inclusive, one can derive what the average growth rate must be for years 4 and 5. The last column in the workpapers reports the number of investment analysts who contributed a five-year growth forecast.

As mentioned above, *Value Line* does not provide earnings growth forecasts for all companies in the water sample. In addition, at the present time, *Value Line's* time horizon for the water and gas LDC sample differ. For the water sample, *Value Line* provides

[6] See Workpaper #2 to Table No. MJV-5 for details.

earnings per share forecasts for fiscal year end 2005 and 2006 and for a 2007 through 2009 horizon. For the gas LDC sample, *Value Line* provides earnings per share forecasts for fiscal year end 2005 and 2006 and with a 2008 through 2010 horizon. The water sample forecasts represent an average of about four years while the gas LDC forecasts represent an average of about four and 3/4 years. Panel B of Workpaper #3 to Tables No. MJV-5 and MJV-16 performs growth rate calculations for 2006 through 2009 based upon *Value Line*'s earning estimates. The calculations are similar to that of Panel A.[7]

The growth rate estimates for IBES and *Value Line* are combined in Panel C of Workpaper #3 to Table No. MJV-5 for the water sample and Table No. MJV-16 for the gas LDC sample by weighting the IBES annual forecasts by the number of analysts making that forecast and treating the *Value Line* forecast as one analyst's forecast.[8]

In the simple DCF, I use the five-year average annual growth rate as the perpetual growth rate.[9] In the multistage DCF model, the growth rates for fiscal years 2005-2009 are employed to permit variation in growth rates in the near-term[10] while I rely on the long-term GDP growth as an estimate of the perpetual earnings growth rate for the two samples.[11]

Q16. Do these growth rates correspond to the ideal you mentioned above?

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[7] The 2004 Earnings per Share (EPS) for the companies reported in Workpaper #1 to Tables No. MJV-5 and Table No. MJV-16 are provided by IBES while the EPS reported in Workpaper #2 to Table No. MJV-5 and Table No. MJV-16 are provided by *Value Line.*

[8] I treat the *Value Line* forecasts as though they overlap exactly with the forecasts from IBES. These growth rates underlie my simple and multi-stage DCF analyses.

[9] This growth rate is in column 6 in Table No. MJV-5 for the water sample and in Table No. MJV-16 for the gas LDC sample.

[10] The growth rates for fiscal years 2005-2009 are shown in Workpaper #3 to Table No. MJV-5 and to Table No. MJV-16, columns 1-5.

[11] I use the long-term GDP growth rate estimate from Blue Chip Economic Indicators, March 10, 2005.

A16. No. While forecasted growth rates are the quantity required in principle, the forecasts need to go far enough out into the future so that it is reasonable to believe that investors expect a stable growth path afterwards. As can be seen in Panel C of Workpaper #3 to Table No. MJV-5 for the water sample and to Panel C of Workpaper #3 to Table No. MJV-16 for the gas LDC sample, the growth rate estimates do not support the view that investors are expecting growth rates equal to the single perpetual growth rate assumed in the simple DCF model. The growth rate forecasts vary substantially in the short-term, and the five-year growth rate forecasts are also quite different from company to company. However, the five-year growth rate forecasts for the gas LDC sample vary much less from company to company than do the five-year growth rate forecasts for the water companies. Similarly, the short-term growth forecast for companies in the gas LDC sample vary much less than do the forecasts for the short-term growth forecast for the water sample companies. There are also generally fewer analysts forecasting earnings for the companies in the water sample.[12]

It is clear that much longer detailed growth rate forecasts than currently available from IBES and *Value Line* would be needed to implement the DCF model in a completely reliable way for these two samples at this time; however, the general stability of the 5-year growth rate forecasts for the gas LDC sample indicates a higher degree of reliability than for the water sample at this time. I submit DCF evidence in this case for both the water utility sample and the gas LDC sample as a check on the equity risk premium approach estimates.

[12] For two of the six water utility companies utilized in the DCF analysis, only one analyst provided a long-term growth forecast and one company has only two analysts forecasts (see Workpaper #3 to Table No. MJV-5, Panel C). In contrast, all companies in the gas LDC sample have long-term growth forecasts from at least three analysts (see Workpaper #3 to Table No. MJV-16, Panel C).

C. DIVIDEND AND PRICE INPUTS

Q17. What values do you use for dividends and stock prices?

A17. Dividend payments are for the 1st quarter of 2005 as reported by Compustat. This dividend is grown at the estimated growth rate and divided by the price described below to estimate the dividend yield for the simple and multi-stage DCF models.

Stock prices are the average of the closing stock prices for the 15 trading days (approximately three weeks) ending April 1, 2005 for all sample companies except Aqua America Inc., which ends April 8, 2005. This time period coincides with the just prior to the release dates of the IBES growth forecasts so that the information on growth rates and stock prices are contemporaneous.[13] I do not use a longer period to measure the price because that would be inconsistent with the principles that underlie the DCF formula. The DCF approach assumes the stock price is the present value of future expected dividends. Stock prices six months or a year ago reflect expectations at that time, which are different from those that underlie the current IBES and *Value Line* forecasts. At the same time, use of an average over a brief period as opposed to a single day helps guard against a company's price on a particular day price being unduly influenced by mistaken information, differences in trading frequency, and the like.

The closing stock price is used because it is at least as good as any other measure of the day's outcome, and may be better for DCF purposes. In particular, if there were any

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[13] IBES growth rate forecasts were released on April 1, 2005 for all companies in both samples except for Aqua America whose IBES growth rate forecast was released on April 8, 2005.

single price during the day that would affect investors' decisions to buy or sell a stock, I would suspect that it would be each day's closing price, not the high or low during the day. The daily price changes reported in the financial pages, for example, are from close to close, not from high to high or from low to low.

D. COMPANY-SPECIFIC DCF COST OF CAPITAL ESTIMATES

Q18. What cost of equity estimates do these data yield?

A18. The cost of equity results for the simple and multi-stage DCF models are shown in Table No. MJV-6 for the water utility sample and in Table No. MJV-17 for the gas LDC sample. Panel A reports the results for the simple DCF method and Panel B reports the results for the multi-stage DCF method using the long-term GDP growth rate as the perpetual growth rate.

Q19. What information is provided in Table No. MJV-7 and Table No. MJV-18?

A19. In these tables, the capital structure, cost of equity estimates, and cost of debt estimates are combined to obtain the overall cost of capital for each sample company. The results are presented in Table No. MJV-7 for the water utility sample and in Table No. MJV-18 for the gas LDC sample. Panel A relies on the simple DCF cost of equity results, and Panel B relies on the multi-stage DCF cost of equity results.

For both samples, I also report the average for the subsample of companies that have a large percentage of revenue from regulated activities.[14]

Q20. What do the values in Table No. MJV-7 and Table No. MJV- 18 imply about the cost of equity for the sample companies at Paradise Valley's 36.7 percent equity ratio?

A20. The overall after-tax weighted-average cost of capital from these tables for both DCF methods and for the subsamples are reported in column one of Table No. MJV-8 and Table No. MJV-19. Column 6 of the tables reports the cost of equity consistent with the Paradise Valley's 36.7 percent equity thicknesses and the samples' average weighted-average cost of capital. The sample average ATWACCs and corresponding costs of equity at a 36.7 percent equity ratio are also displayed in Table 2 and Table 4 of my direct testimony.

The implications of these numbers are discussed in my direct testimony, along with the findings of the equity risk premium approach.

[14] The 2004 revenues from regulated businesses is above 80 percent for the water utility sample and above 70 percent for the gas LDC sample. (See Table No. MJV-2 and Table No. MJV-13.) Also, the water subsample excludes York Water which has numerous data problems.

Table No. MJV-1

Index to Tables for the Testimony of Michael J. Vilbert

Table No. MJV-2

2004 Water Utility Sample

Percentage of Revenue from Regulated Activity

Company	State [1]	2004 [2]
American States Water Co	CA	99%
California Water Service Gp	CA	95%
Connecticut Water Svc Inc	CT	91%
Middlesex Water Co	NJ	86%
Aqua America Inc	PA	97%
SJW Corp	CA	95%
Southwest Water Co	CA	37%
York Water Co	PA	92%

Sources and Notes:
[1]: Compustat as of April, 2005.
[2]: Workpaper #1 to Table No. MJV-2; Panels A - H.

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel A: American States Water Co ($MM)

	% total 2004	2004
Operating Revenues		
Water		
SCW Water *	85%	194.091
SCW Electric *	11%	25.594
CCWC Water *	3%	6.544
Other (Includes FBWS)	1%	1.776
Total Operating Revenues		228.005
Estimated % Regulated Revenues (includes *)		**99%**

Sources and Notes:

American States Water Co's 2004 10-K, Note 14 - Business Segments.

FBWS, found in the "other" revenue segment, is assumed to not be a regulated entity.

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel B: California Water Service Gp ($MM)

	% total 2004	2004
Operating Revenues		
Residential	70%	221.323
Business	18%	55.803
Industrial	4%	13.592
Public Authorities	5%	15.118
Other	3%	9.731
Total Operating Revenues		315.567
Estimated % Regulated Revenues		**95%**

Sources and Notes:
California Water Service Gp's 2004 10-K, Ten-Year Financial Review.
On page 6 of the 10-K, there is a note saying that 5% of net income is from non-regulated activities. This is assumed true for operating revenues as well.

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel C: Connecticut Water Svc Inc ($MM)

	% total 2004	2004
Operating Revenues		
Water Activities*	91%	48.493
Real Estate Transactions	0%	-0.012
Services and Rentals	9%	4.818
Total Operating Revenues		53.299
Estimated % Regulated Revenues (includes *)		**91%**

Sources and Notes:
Connecticut Water Svc Inc's 2004 10-K, Note 14 - Segment Reporting.

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel D: Middlesex Water Co ($MM)

	% total 2004	2004
Operating Revenues		
Regulated *	86%	60.745
Non-Regulated	15%	10.366
Inter-segment Elimination		(0.120)
Total Operating Revenues		70.991
Estimated % Regulated Revenues (includes *)		**86%**

Sources and Notes:
Middlesex Water Co's 2004 10-K, Note 8 - Business Segment Data.

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel E: Aqua America Inc ($MM)

	% total 2004	2004
Operating Revenues		
Residential Water *	60%	264.910
Commercial Water *	15%	65.605
Fire Protection*	5%	20.771
Industrial Water *	4%	17.377
Other Water *	5%	23.822
Wastewater *	8%	35.931
Water and Wastewater Operating Contracts and Other	3%	13.623
Total Operating Revenues		442.039
Estimated % Regulated Revenues (includes *)		**97%**

Sources and Notes:

Aqua America Inc's 2004 10-K, Operating Revenues on pages 5 and 6.

On page 6, there is a note saying that "...[W]e had other non-regulated revenues that were primarily associated with operating...and data processing service fees of $13,623 in 2004. This is assumed to be the segment called "Water and Wastewater Operating Contracts and Other".

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel F: SJW Corp ($MM)

	% total 2004	2004
Operating Revenues		
Regulated *	95%	157.951
Non Regulated	5%	8.960
Total Operating Revenues		166.911
Estimated % Regulated Revenues (includes *)		**95%**

Sources and Notes:
SJW Corp's 2004 10-K, Note 15 - Non-regulated Businesses.

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel G: Southwest Water Co ($MM)

	% total 2004	2004
Operating Revenues		
Services Group	63%	118.532
Utility Group *	37%	69.420
Total Operating Revenues		187.952
Estimated % Regulated Revenues (includes *)		**37%**

Sources and Notes:
Southwest Water Co 2004 10-K, Note 12 - Segment Information.
On page 74, there is a note saying that "The Services Group operates and manages water and wastewater treatment facilities owned by cities, public agencies, municipal utility districts, private entities and investor-owned utilities...while subject to certain environmental standards, is not regulated..."

Workpaper #1 to Table No. MJV-2

2004 Water Utility Sample: Breakdown of Revenues

Panel H: York Water Co ($MM)

	% total 2004	2004
Operating Revenues		
Residential *	61%	13.789
Commercial and Industrial *	31%	6.893
Other	8%	1.822
Total Operating Revenues		22.504
Estimated % Regulated Revenues (includes *)		**92%**

Sources and Notes:
York Water Co 2004 10-K.
It is assumed that Other is not regulated.

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel A: American States Water Co

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$251	$251	$212	$213	$200	$193	[a]
Shares Outstanding (*in millions*) - Common	17	17	15	15	15	15	[b]
Price per Share - Common	$25.60	$25.87	$25.11	$23.38	$24.32	$24.00	[c]
Market Value of Common Equity	$429	$433	$382	$355	$368	$363	[d] = [b] x [c].
Market to Book Value of Common Equity	1.71	1.72	1.80	1.66	1.84	1.88	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$0	$2	$2	[f]
Market Value of Preferred Equity	$0	$0	$0	$0	$2	$2	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$53	$53	$58	$52	$88	$52	[h]
Current Liabilities	$86	$86	$96	$80	$64	$80	[i]
Current Portion of Long-Term Debt	$1	$1	$1	$13	$1	$1	[j]
Net Working Capital	($32)	($32)	($37)	($14)	$25	($27)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$45	$45	$56	$35	$20	$45	[l]
Adjusted Short-Term Debt	$32	$32	$37	$14	$0	$27	[m] = See Sources and Notes.
Long-Term Debt	$310	$310	$307	$301	$315	$176	[n]
Book Value of Long-Term Debt	$311	$311	$308	$315	$316	$177	[o] = [n] + [j].
Market Value of Long-Term Debt	$311	$311	$308	$315	$316	$177	[p] = [o].
Market Value of Debt	$344	$344	$344	$329	$316	$204	[q] = [p] + [m].
MARKET VALUE OF FIRM	$772	$777	$726	$684	$686	$569	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	55.52%	55.78%	52.58%	51.90%	53.64%	63.78%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	-	0.27%	0.34%	[t] = [g] / [r].
Debt - Market Value Ratio	44.48%	44.22%	47.42%	48.10%	46.08%	35.89%	[u] = [q] / [r].

Sources and Notes:

Compustat as of April 2005.

The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-6.

[m] =
(1): 0 if [k] > 0.
(2): The *absolute value of [k] if* [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel B: California Water Service Gp

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$288	$288	$245	$199	$197	$199	[a]
Shares Outstanding (in millions) - Common	18	18	17	15	15	15	[b]
Price per Share - Common	$33.83	$37.18	$27.76	$23.96	$25.77	$26.71	[c]
Market Value of Common Equity	$621	$683	$470	$364	$391	$405	[d] = [b] x [c].
Market to Book Value of Common Equity	2.16	2.37	1.92	1.83	1.99	2.03	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$3	$3	$3	$3	$3	$3	[f]
Market Value of Preferred Equity	$3	$3	$3	$3	$3	$3	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$70	$70	$44	$43	$40	$41	[h]
Current Liabilities	$57	$57	$64	$92	$79	$64	[i]
Current Portion of Long-Term Debt	$1	$1	$1	$1	$5	$3	[j]
Net Working Capital	$14	$14	($19)	($48)	($33)	($20)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$0	$0	$6	$36	$22	$15	[l]
Adjusted Short-Term Debt	$0	$0	$6	$36	$22	$15	[m] = See Sources and Notes.
Long-Term Debt	$275	$275	$272	$250	$203	$187	[n]
Book Value of Long-Term Debt	$276	$276	$273	$251	$208	$190	[o] = [n] + [j].
Market Value of Long-Term Debt	$276	$276	$273	$251	$208	$190	[p] = [o].
Market Value of Debt	$276	$276	$280	$288	$230	$205	[q] = [p] + [m].
MARKET VALUE OF FIRM							
	$901	$962	$753	$655	$625	$613	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	68.98%	70.97%	62.41%	55.54%	62.63%	66.04%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	0.39%	0.36%	0.46%	0.53%	0.56%	0.57%	[t] = [g] / [r].
Debt - Market Value Ratio	30.63%	28.67%	37.13%	43.93%	36.81%	33.39%	[u] = [q] / [r].

Sources and Notes:

Compustat as of April 2005.

The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-6.

[m] =

(1): 0 if [k] > 0.

(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].

(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel C: Connecticut Water Svc Inc

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$88	$88	$83	$80	$71	$65	[a]
Shares Outstanding (in millions) - Common	8	8	8	8	8	7	[b]
Price per Share - Common	$25.13	$26.47	$27.71	$25.85	$29.79	$19.76	[c]
Market Value of Common Equity	$202	$213	$221	$205	$228	$144	[d] = [b] x [c].
Market to Book Value of Common Equity	2.30	2.42	2.65	2.57	3.22	2.22	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$1	$1	$1	$1	$1	$1	[f]
Market Value of Preferred Equity	$1	$1	$1	$1	$1	$1	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$15	$15	$11	$10	$9	$9	[h]
Current Liabilities	$16	$16	$15	$15	$13	$9	[i]
Current Portion of Long-Term Debt	$0	$0	$0	$0	$2	$0	[j]
Net Working Capital	($0)	($0)	($4)	($5)	($1)	$0	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$6	$6	$10	$7	$2	$1	[l]
Adjusted Short-Term Debt	$0	$0	$4	$5	$1	$0	[m] = See Sources and Notes.
Long-Term Debt	$66	$66	$65	$65	$64	$65	[n]
Book Value of Long-Term Debt	$67	$67	$65	$65	$66	$65	[o] = [n] + [j].
Market Value of Long-Term Debt	$67	$67	$65	$65	$66	$65	[p] = [o].
Market Value of Debt	$67	$67	$69	$70	$67	$65	[q] = [p] + [m].
MARKET VALUE OF FIRM	$270	$281	$290	$276	$296	$209	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	74.82%	75.79%	76.06%	74.38%	77.01%	68.67%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	0.31%	0.30%	0.29%	0.31%	0.29%	0.37%	[t] = [g] / [r].
Debt - Market Value Ratio	24.86%	23.91%	23.65%	25.31%	22.71%	30.97%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Price per share for the DCF Capital Structure calculation is an average of prices starting from 4/1/2005 going back 15 business days rather than 12/14/01, as is indicated in the I/B/E/S sheets.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel D: Middlesex Water Co

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$95	$95	$80	$77	$72	$71	[a]
Shares Outstanding (in millions) - Common	11	11	11	10	10	10	[b]
Price per Share - Common	$17.98	$19.27	$20.54	$16.02	$17.01	$16.70	[c]
Market Value of Common Equity	$204	$219	$217	$166	$173	$169	[d] = [b] x [c].
Market to Book Value of Common Equity	2.15	2.30	2.73	2.17	2.39	2.39	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$4	$4	$4	$4	$4	$4	[f]
Market Value of Preferred Equity	$4	$4	$4	$4	$4	$4	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$16	$16	$14	$20	$25	$15	[h]
Current Liabilities	$28	$28	$28	$30	$26	$18	[i]
Current Portion of Long-Term Debt	$1	$1	$1	$1	$0	$0	[j]
Net Working Capital	($11)	($11)	($12)	($9)	($1)	($3)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$11	$11	$13	$18	$13	$6	[l]
Adjusted Short-Term Debt	$11	$11	$12	$9	$1	$3	[m] = See Sources and Notes.
Long-Term Debt	$115	$115	$97	$87	$88	$82	[n]
Book Value of Long-Term Debt	$116	$116	$98	$88	$88	$82	[o] = [n] + [j].
Market Value of Long-Term Debt	$116	$116	$98	$88	$88	$82	[p] = [o].
Market Value of Debt	$127	$127	$111	$97	$89	$85	[q] = [p] + [m].
MARKET VALUE OF FIRM	$335	$350	$332	$267	$266	$258	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	60.90%	62.53%	65.41%	62.20%	65.02%	65.48%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	1.21%	1.16%	1.22%	1.52%	1.53%	1.58%	[t] = [g] / [r].
Debt - Market Value Ratio	37.89%	36.31%	33.36%	36.28%	33.45%	32.94%	[u] = [q] / [r].

Sources and Notes:

Compustat as of April 2005.

The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.

Prices are reported in Workpaper #1 to Table No. MJV-6.

[m] =

(1): 0 if [k] > 0.

(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].

(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel E: Aqua America Inc

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$747	$747	$658	$493	$472	$428	[a]
Shares Outstanding (in millions) - Common	95	95	93	85	85	84	[b]
Price per Share ($) - Common	$24.50	$24.18	$22.08	$16.47	$18.59	$15.07	[c]
Market Value of Common Equity	$2,337	$2,306	$2,045	$1,398	$1,589	$1,264	[d] = [b] x [c].
Market to Book Value of Common Equity	3.13	3.09	3.11	2.84	3.37	2.96	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$0	$1	$2	[f]
Market Value of Preferred Equity	$0	$0	$0	$0	$1	$2	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$90	$90	$84	$71	$70	$71	[h]
Current Liabilities	$217	$217	$232	$227	$203	$173	[i]
Current Portion of Long-Term Debt	$50	$50	$39	$34	$15	$16	[j]
Net Working Capital	($77)	($77)	($109)	($121)	($118)	($87)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$85	$85	$96	$115	$110	$89	[l]
Adjusted Short-Term Debt	$77	$77	$96	$115	$110	$87	[m] = See Sources and Notes.
Long-Term Debt	$784	$784	$697	$583	$517	$469	[n]
Book Value of Long-Term Debt	$835	$835	$736	$617	$531	$485	[o] = [n] + [j].
Market Value of Long-Term Debt	$835	$835	$736	$617	$531	$485	[p] = [o].
Market Value of Debt	$912	$912	$833	$732	$641	$571	[q] = [p] + [m].
MARKET VALUE OF FIRM							
	$3,248	$3,218	$2,877	$2,130	$2,232	$1,837	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	71.93%	71.67%	71.06%	65.62%	71.22%	68.81%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	0.01%	0.05%	0.10%	[t] = [g] / [r].
Debt - Market Value Ratio	28.07%	28.33%	28.94%	34.37%	28.73%	31.10%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/8/2005.
Prices are reported in Workpaper #1 to Table No. MJV-6.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel F: SJW Corp

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$185	$185	$166	$153	$149	$144	[a]
Shares Outstanding (in millions) - Common	9	9	9	9	9	9	[b]
Price per Share ($) - Common	$36.48	$36.87	$29.51	$26.30	$28.41	$33.80	[c]
Market Value of Common Equity	$333	336.84	269.57	240.24	259.49	308.76	[d] = [b] x [c].
Market to Book Value of Common Equity	1.80	1.82	1.62	1.57	1.74	2.14	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[f]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$28	$28	$27	$19	$20	$15	[h]
Current Liabilities	$15	$15	$15	$24	$24	$27	[i]
Current Portion of Long-Term Debt	$0	$0	$0	$0	$0	$0	[j]
Net Working Capital	$13	$13	$12	($5)	($4)	($11)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$11	$12	$11	[l]
Adjusted Short-Term Debt	$0	$0	$0	$5	$4	$11	[m] = See Sources and Notes.
Long-Term Debt	$144	$144	$140	$110	$110	$90	[n]
Book Value of Long-Term Debt	$144	$144	$140	$110	$110	$90	[o] = [n] + [j].
Market Value of Long-Term Debt	$144	$144	$140	$110	$110	$90	[p] = [o].
Market Value of Debt	$144	$144	$140	$115	$114	$101	[q] = [p] + [m].
MARKET VALUE OF FIRM	$477	$481	$409	$355	$373	$410	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	69.85%	70.07%	65.85%	67.65%	69.53%	75.31%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	[t] = [g] / [r].
Debt - Market Value Ratio	30.15%	29.93%	34.15%	32.35%	30.47%	24.69%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Price per share for the DCF Capital Structure calculation is an average of prices starting from 4/1/2005 going back 15 business days rather than 4/11/03, as is indicated in the I/B/E/S sheets.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel G: Southwest Water Co

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$126	$126	$79	$61	$54	$48	[a]
Shares Outstanding (in millions) - Common	19	19	15	13	13	13	[b]
Price per Share ($) - Common	$10.97	$12.98	$11.44	$9.47	$9.66	$7.68	[c]
Market Value of Common Equity	$213	$252	$176	$123	$130	$101	[d] = [b] x [c].
Market to Book Value of Common Equity	1.69	2.00	2.23	2.01	2.40	2.10	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$1	$1	$1	$1	[f]
Market Value of Preferred Equity	$0	$0	$1	$1	$1	$1	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$45	$45	$35	$30	$31	$27	[h]
Current Liabilities	$36	$36	$31	$32	$26	$26	[i]
Current Portion of Long-Term Debt	$3	$3	$3	$2	$5	$5	[j]
Net Working Capital	$13	$13	$7	$0	$10	$6	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$0	$0	[l]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	[m] = See Sources and Notes.
Long-Term Debt	$116	$116	$73	$81	$65	$46	[n]
Book Value of Long-Term Debt	$119	$119	$76	$83	$70	$52	[o] = [n] + [j].
Market Value of Long-Term Debt	$119	$119	$76	$83	$70	$52	[p] = [o].
Market Value of Debt	$119	$119	$76	$83	$70	$52	[q] = [p] + [m].
MARKET VALUE OF FIRM							
	$332	$371	$252	$207	$201	$153	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	64.00%	67.79%	69.78%	59.61%	64.96%	66.05%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	0.14%	0.12%	0.20%	0.25%	0.26%	0.34%	[t] = [g] / [r].
Debt - Market Value Ratio	35.86%	32.09%	30.02%	40.14%	34.79%	33.62%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-6.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-3

Market Value of the 2004 Water Utility Sample

Panel H: York Water Co

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$48	$48	$39	$37	$36	$32	[a]
Shares Outstanding (in millions) - Common	7	7	6	6	6	6	[b]
Price per Share ($) - Common	$19.16	$19.60	$18.21	$15.39	$14.89	$8.63	[c]
Market Value of Common Equity	$132	$135	$117	$98	$94	$52	[d] = [b] x [c].
Market to Book Value of Common Equity	2.75	2.81	2.99	2.63	2.62	1.60	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[f]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$5	$5	$4	$4	$4	$4	[h]
Current Liabilities	$21	$21	$14	$5	$5	$6	[i]
Current Portion of Long-Term Debt	$16	$16	$3	$0	$0	$0	[j]
Net Working Capital	$0	$0	($7)	($2)	($1)	($2)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$0	$0	$7	$3	$2	$3	[l]
Adjusted Short-Term Debt	$0	$0	$7	$2	$1	$2	[m] = See Sources and Notes.
Long-Term Debt	$36	$36	$30	$33	$33	$33	[n]
Book Value of Long-Term Debt	$52	$52	$33	$33	$33	$33	[o] = [n] + [j].
Market Value of Long-Term Debt	$52	$52	$33	$33	$33	$33	[p] = [o].
Market Value of Debt	$52	$52	$40	$34	$34	$35	[q] = [p] + [m].
MARKET VALUE OF FIRM	$184	$187	$157	$132	$128	$87	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	71.77%	72.22%	74.60%	73.98%	73.61%	59.77%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	[t] = [g] / [r].
Debt - Market Value Ratio	28.23%	27.78%	25.40%	26.02%	26.39%	40.23%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-6.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-4

2004 Water Utility Sample

Capital Structure Summary

Company	DCF Capital Structure			5-Year Average Capital Structure		
	Common Equity - Value Ratio [1]	Preferred Equity - Value Ratio [2]	Debt - Value Ratio [3]	Common Equity - Value Ratio [4]	Preferred Equity - Value Ratio [5]	Debt - Value Ratio [6]
American States Water Co	0.56	-	0.44	0.56	0.00	0.44
California Water Service Gp	0.69	0.00	0.31	0.64	0.00	0.36
Connecticut Water Svc Inc	0.75	0.00	0.25	0.74	0.00	0.25
Middlesex Water Co	0.61	0.01	0.38	0.64	0.01	0.34
Aqua America Inc	0.72	-	0.28	0.70	0.00	0.30
SJW Corp	0.70	-	0.30	0.70	-	0.30
Southwest Water Co	0.64	0.00	0.36	0.66	0.00	0.34
York Water Co	0.72	-	0.28	0.71	-	0.29

Sources and Notes:
[1], [4]: Workpaper #1 to Table No. MJV-4.
[2], [5]: Workpaper #2 to Table No. MJV-4.
[3], [6]: Workpaper #3 to Table No. MJV-4.
Values in this table may not add up to one because of rounding.

Workpaper #1 to Table No. MJV-4

2004 Water Utility Sample

Calculation of the Average Common Equity - Market Value Ratio from 2000 to 2004

Company	DCF Capital Structure [1]	2004 [2]	2003 [3]	2002 [4]	2001 [5]	2000 [6]	5-Year Average [7]
American States Water Co	0.56	0.56	0.53	0.52	0.54	0.64	0.56
California Water Service Gp	0.69	0.71	0.62	0.56	0.63	0.66	0.64
Connecticut Water Svc Inc	0.75	0.76	0.76	0.74	0.77	0.69	0.74
Middlesex Water Co	0.61	0.63	0.65	0.62	0.65	0.65	0.64
Aqua America Inc	0.72	0.72	0.71	0.66	0.71	0.69	0.70
SJW Corp	0.70	0.70	0.66	0.68	0.70	0.75	0.70
Southwest Water Co	0.64	0.68	0.70	0.60	0.65	0.66	0.66
York Water Co	0.72	0.72	0.75	0.74	0.74	0.60	0.71

Sources and Notes:

[1] - [6]: Table No. MJV-3; Panels A - H, [s].

[7]: { [2] + [3] + [4] + [5] + [6] } / 5.

Workpaper #2 to Table No. MJV-4

2004 Water Utility Sample

Calculation of the Average Preferred Equity - Market Value Ratio from 2000 to 2004

Company	DCF Capital Structure [1]	2004 [2]	2003 [3]	2002 [4]	2001 [5]	2000 [6]	5-Year Average [7]
American States Water Co	-	-	-	-	0.00	0.00	0.00
California Water Service Gp	0.00	0.00	0.00	0.01	0.01	0.01	0.00
Connecticut Water Svc Inc	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Middlesex Water Co	0.01	0.01	0.01	0.02	0.02	0.02	0.01
Aqua America Inc	-	-	-	0.00	0.00	0.00	0.00
SJW Corp	-	-	-	-	-	-	-
Southwest Water Co	0.00	0.00	0.00	0.00	0.00	0.00	0.00
York Water Co	-	-	-	-	-	-	-

Sources and Notes:
[1] - [6]: Table No. MJV-3; Panels A - H, [t].
[7]: { [2] + [3] + [4] + [5] + [6] } / 5.
Values reported as 0.00 have an insignificant amount of preferred equity.

Workpaper #3 to Table No. MJV-4

2004 Water Utility Sample

Calculation of the Average Debt - Market Value Ratio from 2000 to 2004

Company	DCF Capital Structure [1]	2004 [2]	2003 [3]	2002 [4]	2001 [5]	2000 [6]	5-Year Average [7]
American States Water Co	0.44	0.44	0.47	0.48	0.46	0.36	0.44
California Water Service Gp	0.31	0.29	0.37	0.44	0.37	0.33	0.36
Connecticut Water Svc Inc	0.25	0.24	0.24	0.25	0.23	0.31	0.25
Middlesex Water Co	0.38	0.36	0.33	0.36	0.33	0.33	0.34
Aqua America Inc	0.28	0.28	0.29	0.34	0.29	0.31	0.30
SJW Corp	0.30	0.30	0.34	0.32	0.30	0.25	0.30
Southwest Water Co	0.36	0.32	0.30	0.40	0.35	0.34	0.34
York Water Co	0.28	0.28	0.25	0.26	0.26	0.40	0.29

Sources and Notes:
[1] - [6]: Table No. MJV-3; Panels A - H, [u].
[7]: { [2] + [3] + [4] + [5] + [6] } / 5.

Table No. MJV-5

2004 Water Utility Sample

Combined I/B/E/S and Value Line Estimated Growth Rates

Company	I/B/E/S Growth Rate Long-Term [1]	I/B/E/S Number of Long-Term Growth Rate Estimates [2]	Value Line Growth Rate Long-Term [3]	Combined I/B/E/S and Value Line Growth Rate [4]
American States Water Co	3.0%	1	11.3%	7.2%
California Water Service Gp	6.5%	4	5.6%	6.3%
Middlesex Water Co	6.0%	1	n/a	6.0%
Aqua America Inc	10.5%	4	8.1%	10.0%
Southwest Water Co	7.5%	4	n/a	7.5%
York Water Co	7.0%	1	n/a	7.0%

Sources and Notes:

[1] - [2]: Workpaper #1 to Table No. MJV-5.

[3]: Workpaper #3 to Table No. MJV-5; Panel B, [5].

[4]: (([1] x [2]) + [3]) / ([2] + 1).

If [3] is not available, the I/B/E/S Long-Term Growth Rate is used.

Connecticut Water Svs Inc and SJW Corp have no recent I/B/E/S long-term and interim growth rate estimates respectively and are excluded from the DCF analysis.

Workpaper #1 to Table No. MJV-5

2004 Water Utility Sample

I/B/E/S Earnings Per Share Data

Company	EPS Fiscal Year-End 2004 Observed [1]	EPS Fiscal Year-End 2005 Estimate [2]	EPS Fiscal Year-End 2006 Estimate [3]	Growth Rate Long-Term [4]	Number of Long-Term Growth Rate Estimates [5]
American States Water Co	$1.06	$1.35	n/a	3.0%	1
California Water Service Gp	$1.46	$1.59	$1.73	6.5%	4
Middlesex Water Co	$0.61	$0.66	$0.79	6.0%	1
Aqua America Inc	$0.86	$0.96	$1.05	10.5%	4
Southwest Water Co	$0.25	$0.40	n/a	7.5%	4
York Water Co	$0.80	$0.79	n/a	7.0%	1

Sources and Notes:

[1] - [5]: I/B/E/S as of April 1, 2005 for all companies except Aqua America Inc, which is from I/B/E/S as of April 8, 2005. Connecticut Water Svs Inc and SJW Corp have no recent I/B/E/S long-term and interim growth rate estimates respectively and are excluded from the DCF analysis.

Workpaper #2 to Table No. MJV-5

2004 Water Utility Sample

Value Line Earnings Per Share Data

Company	EPS Fiscal Year 2004 Estimate [1]	EPS Fiscal Year 2005 Estimate [2]	EPS 2005 - 2006 Estimate [3]	Combined EPS Fiscal Year 2005 Estimate [4]	Combined EPS Fiscal Year 2006 Estimate [5]	EPS 2007 - 2009 Estimate [6]
American States Water Co	$1.16	$1.45	n/a	$1.45	n/a	$2.00
California Water Service Gp	$1.58	$1.70	n/a	$1.70	n/a	$2.00
Middlesex Water Co	$0.69	n/a	$0.80	$0.74	$0.80	n/a
Aqua America Inc	$0.85	$0.95	n/a	$0.95	n/a	$1.20
Southwest Water Co	$0.45	n/a	$0.51	$0.48	$0.51	n/a
York Water Co	$0.75	n/a	$0.79	$0.77	$0.79	n/a

Sources and Notes:
[1] - [2] and [6]: Value Line Investment Survey; January 28, 2005.
[3]: Value Line Small and MidCap Edition; January 28, 2005.
[4]: If [3] is not available, then [2]. If [3] is available, then [1] x ([3] / [1]) ^(1/2).
[5]: [4] x ([3] / [1]) ^(1/2).

Workpaper #3 to Table No. MJV-5

Estimated Growth Rates of the 2004 Water Utility Sample

Panel A: Using I/B/E/S Forecasts

Company	Growth Rate: FY 04 - 05 [1]	Growth Rate: FY 05 - 06 [2]	Growth Rate: FY 06 - 07 [3]	Growth Rate: FY 07 - 08 [4]	Growth Rate: FY 08 - 09 [5]	Growth Rate Long-Term [6]	Number of Long-Term Growth Rate Estimates [7]
American States Water Co	27.4%	-2.3%	-2.3%	-2.3%	-2.3%	3.0%	1
California Water Service Gp	8.9%	8.8%	5.0%	5.0%	5.0%	6.5%	4
Middlesex Water Co	8.2%	19.7%	1.1%	1.1%	1.1%	6.0%	1
Aqua America Inc	11.6%	9.4%	10.5%	10.5%	10.5%	10.5%	4
Southwest Water Co	60.0%	-2.7%	-2.7%	-2.7%	-2.7%	7.5%	4
York Water Co	-1.3%	9.2%	9.2%	9.2%	9.2%	7.0%	1

Sources and Notes:

[1]: From Workpaper #1 to Table No. MJV-5: ([2] - [1]) / [1].

[2]: From Workpaper #1 to Table No. MJV-5: ([3] - [2]) / [2].

[3]: From Workpaper #1 to Table No. MJV-5:

If [3] is n/a then {([1] x ((1 + [4]) ^ 5) / [2]) ^ (1/4)} - 1; otherwise, {([1] x ((1 + [4]) ^ 5) / [3]) ^ (1/3)} - 1.

[4]: [3].

[5]: [3].

[6] and [7]: Workpaper #1 to Table No. MJV-5, [4] and [5].

Workpaper #3 to Table No. MJV-5

Estimated Growth Rates of the 2004 Water Utility Sample

Panel B: Using Value Line Forecasts

Company	Growth Rate: FY 04 - 05 [1]	Growth Rate: FY 05 - 06 [2]	Growth Rate: FY 06 - 07 [3]	Growth Rate: FY 07 - 08 [4]	Growth Rate: FY 08 - 09 [5]	Growth Rate Long-Term [6]
American States Water Co	25.0%	11.3%	11.3%	11.3%	11.3%	11.3%
California Water Service Gp	7.6%	5.6%	5.6%	5.6%	5.6%	5.6%
Middlesex Water Co	7.7%	7.7%	n/a	n/a	n/a	n/a
Aqua America Inc	11.8%	8.1%	8.1%	8.1%	8.1%	8.1%
Southwest Water Co	6.5%	6.5%	n/a	n/a	n/a	n/a
York Water Co	2.6%	2.6%	n/a	n/a	n/a	n/a

Sources and Notes:

[1]: From Workpaper #2 to Table No. MJV-5: ([4] - [1]) / [1].

[2]: From Workpaper #2 to Table No. MJV-5:

If [6] is n/a then ([5] - [4]) / [4]; otherwise, {([6] / [2])^(1/3)} - 1.

[3] - [6]: [2].

Workpaper #3 to Table No. MJV-5

Estimated Growth Rates of the 2004 Water Utility Sample

Panel C: Combined I/B/E/S and Value Line Forecasts

Company	Combined Growth Rate: FY 04 - 05 [1]	Combined Growth Rate: FY 05 - 06 [2]	Combined Growth Rate: FY 06 - 07 [3]	Combined Growth Rate: FY 07 - 08 [4]	Combined Growth Rate: FY 08 - 09 [5]	Combined Growth Rate: Long-Term [6]	Number of Estimates [7]
American States Water Co	26.2%	4.5%	4.5%	4.5%	4.5%	7.2%	2
California Water Service Gp	8.6%	8.2%	5.1%	5.1%	5.1%	6.3%	5
Middlesex Water Co	7.9%	13.7%	1.1%	1.1%	1.1%	6.0%	1
Aqua America Inc	11.7%	9.1%	10.0%	10.0%	10.0%	10.0%	5
Southwest Water Co	49.3%	-0.8%	-2.7%	-2.7%	-2.7%	7.5%	4
York Water Co	0.7%	5.9%	9.2%	9.2%	9.2%	7.0%	1

Sources and Notes:

I/B/E/S forecasts are weighted by the number of estimates in the I/B/E/S long-term growth rates, and Value Line estimates are weighted by one.

[1] - [4] and [6]: Weighted average of I/B/E/S and Value Line forecasts.

(The I/B/E/S Estimate from Workpaper #3 to Table No. MJV-5; Panel A x the number of I/B/E/S estimates + the Value Line Estimate from Workpaper #3 to Table No. MJV-5; Panel B) / [7].

Southwest Water Co, Middlesex Water Co and York Water Co have no long-term Value Line estimates. The I/B/E/S growth rates are used exclusively.

[5]: The I/B/E/S Estimate as there is no Value Line growth rate for that year.

[7]: The Number of I/B/E/S long-term growth rate estimates plus one for the Value Line estimate, if available.

Table No. MJV-6

DCF Cost of Equity of the 2004 Water Utility Sample

Panel A: Simple DCF Method (Quarterly)

Company	Stock Price [1]	Quarterly Dividend Q1, 2005 [2]	Annualized Dividend Yield [3]	Combined I/B/E/S and Value Line Long-Term Growth Rate [4]	Quarterly Growth Rate [5]	DCF Cost of Equity [6]
American States Water Co	$25.60	$0.22	3.8%	7.2%	1.7%	11.0%
California Water Service Gp	$33.83	$0.28	3.6%	6.3%	1.5%	9.9%
Middlesex Water Co	$17.98	$0.17	3.9%	6.0%	1.5%	10.0%
Aqua America Inc	$24.50	$0.13	2.3%	10.0%	2.4%	12.4%
Southwest Water Co	$10.97	$0.05	2.0%	7.5%	1.8%	9.5%
York Water Co	$19.16	$0.16	3.5%	7.0%	1.7%	10.5%

Sources and Notes:

[1]: Workpaper #1 to Table No. MJV-6.

[2]: Workpaper #2 to Table No. MJV-6.

[3]: [2] x 4 x (1+[4]) / [1].

[4]: Workpaper #3 to Table No. MJV-5; Panel C.
Middlesex Water Co, Southwest Water Co and York Water Co do not have Value Line long-term growth rates.
The values reported here are those from I/B/E/S.

[5]: {(1 + [4]) ^ (1/4)} - 1.

[6]: {(([2] / [1]) x (1 + [5]) + [5] + 1) ^ 4} - 1.

Table No. MJV-6

DCF Cost of Equity of the 2004 Water Utility Sample

Panel B: Multi-Stage DCF (Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	Stock Price [1]	Quarterly Dividend Q1, 2005 [2]	Combined Growth Rate: FY 04 - 05 [3]	Combined Growth Rate: FY 05 - 06 [4]	Combined Growth Rate: FY 06 - 07 [5]	Combined Growth Rate: FY 07 - 08 [6]	Combined Growth Rate: FY 08 - 09 [7]	Combined Growth Rate: FY 09 - 10 [8]	Combined Growth Rate: FY 10 - 11 [9]	Combined Growth Rate: FY 11 - 12 [10]	Combined Growth Rate: FY 12 - 13 [11]	Combined Growth Rate: FY 13 - 14 [12]	GDP Long-Term Growth Rate [13]	DCF Cost of Equity [14]
American States Water Co	$25.60	$0.22	26.2%	4.5%	4.5%	4.5%	4.5%	6.8%	6.5%	6.2%	5.9%	5.6%	5.3%	9.6%
California Water Service Gp	$33.83	$0.28	8.6%	8.2%	5.1%	5.1%	5.1%	6.1%	6.0%	5.8%	5.6%	5.5%	5.3%	9.1%
Middlesex Water Co	$17.98	$0.17	7.9%	13.7%	1.1%	1.1%	1.1%	5.9%	5.8%	5.7%	5.5%	5.4%	5.3%	9.2%
Aqua America Inc	$24.50	$0.13	11.7%	9.1%	10.0%	10.0%	10.0%	9.2%	8.4%	7.7%	6.9%	6.1%	5.3%	8.3%
Southwest Water Co	$10.97	$0.05	49.3%	-0.8%	-2.7%	-2.7%	-2.7%	7.1%	6.8%	6.4%	6.0%	5.7%	5.3%	7.3%
York Water Co	$19.16	$0.16	0.7%	5.9%	9.2%	9.2%	9.2%	6.7%	6.4%	6.2%	5.9%	5.6%	5.3%	9.1%

Sources and Notes:
[1]: Workpaper #1 to Table No. MJV-6.
[2]: Workpaper #2 to Table No. MJV-6.
[3] - [7]: Workpaper #3 to Table No. MJV-5; Panel C.
The Combined I/B/E/S and Value Line Long-Term Growth Rate (Combined Rate) is from Workpaper #3 to Table No. MJV-5; Panel C, [6].
[8]: Combined Rate - (Combined Rate - [13]) / 6.
[9]: [8] - (Combined Rate - [13]) / 6.
[10]: [9] - (Combined Rate - [13]) / 6.
[11]: [10] - (Combined Rate - [13]) / 6.
[12]: [11] - (Combined Rate - [13]) / 6.
[13]: Blue Chip Economic Indicators, March 10, 2005, page 15. This number is assumed to be the perpetual growth rate.
[14]: Workpaper #3 to Table No. MJV-6.

Workpaper #1 to Table No. MJV-6

2004 Water Utility Sample

Common Stock Prices from March 11, 2005 to April 01, 2005
Common Stock Prices for Aqua America Inc from March 18, 2005 to April 08, 2005

Company	01-Apr-05 08-Apr-05	31-Mar-05 07-Apr-05	30-Mar-05 06-Apr-05	29-Mar-05 05-Apr-05	28-Mar-05 04-Apr-05	25-Mar-05 01-Apr-05	24-Mar-05 31-Mar-05	23-Mar-05 30-Mar-05	22-Mar-05 29-Mar-05	21-Mar-05 28-Mar-05	18-Mar-05 25-Mar-05	17-Mar-05 24-Mar-05	16-Mar-05 23-Mar-05	15-Mar-05 22-Mar-05	14-Mar-05 21-Mar-05	11-Mar-05 18-Mar-05	Average
American States Water Co	$25.10	$25.30	$25.90	$25.12	$25.50	-	$25.19	$25.11	$25.11	$25.32	$25.50	$25.52	$26.40	$26.38	$26.25	$26.23	$25.60
California Water Service Gp	$32.87	$33.37	$34.15	$33.53	$33.92	-	$33.41	$33.10	$33.61	$33.78	$33.75	$34.00	$34.05	$34.59	$34.74	$34.53	$33.83
Middlesex Water Co	$17.75	$18.15	$18.35	$17.86	$18.03	-	$17.94	$17.80	$18.05	$18.00	$17.78	$17.90	$17.93	$17.89	$18.30	$18.01	$17.98
Aqua America Inc *	$25.67	$25.17	$24.96	$24.80	$24.62	$24.20	$24.36	$24.52	$24.02	$24.20	-	$23.72	$23.96	$24.38	$24.56	$24.33	$24.50
Southwest Water Co	$10.67	$10.43	$10.84	$10.34	$10.81	-	$10.93	$11.02	$11.06	$10.99	$11.10	$11.11	$11.05	$11.25	$11.47	$11.44	$10.97
York Water Co	$18.68	$19.05	$19.15	$19.10	$19.10	-	$19.20	$19.20	$19.50	$18.52	$18.76	$19.00	$19.05	$19.35	$19.90	$19.90	$19.16

Sources and Notes:
Compustat as of April 2005.
The prices chosen are the daily closing prices from Compustat starting from I/B/E/S forecast day and ending fifteen trading days before.
*Aqua America's I/B/E/S date is April 8, 2005.

Workpaper #2 to Table No. MJV-6

2004 Water Utility Sample

Dividend Payments

Company	1st Quarter 2005 [1]
American States Water Co	$0.22
California Water Service Gp	$0.28
Middlesex Water Co	$0.17
Aqua America Inc	$0.13
Southwest Water Co	$0.05
York Water Co	$0.16

Sources and Notes:
Compustat as of April 2005.

Workpaper #3 to Table No. MJV-6

DCF Cost of Equity of the 2004 Water Utility Sample

Multi-Stage DCF (using the Blue Chip Indicators Long-Term GDP Growth Rate Forecast as the Perpetual Growth Rate)

Year	Company	American States Water Co	California Water Service Gp	Middlesex Water Co	Aqua America Inc	Southwest Water Co	York Water Co
	Current Stock Price	($25.60)	($33.83)	($17.98)	($24.50)	($10.97)	($19.16)
YEAR 2005	Dividend Q2 Estimate	$0.24	$0.29	$0.17	$0.13	$0.06	$0.16
YEAR 2005	Dividend Q3 Estimate	$0.25	$0.30	$0.17	$0.14	$0.06	$0.16
YEAR 2005	Dividend Q4 Estimate	$0.27	$0.30	$0.18	$0.14	$0.07	$0.16
YEAR 2006	Dividend Q1 Estimate	$0.27	$0.31	$0.18	$0.14	$0.07	$0.16
YEAR 2006	Dividend Q2 Estimate	$0.27	$0.32	$0.19	$0.15	$0.07	$0.16
YEAR 2006	Dividend Q3 Estimate	$0.28	$0.32	$0.20	$0.15	$0.07	$0.16
YEAR 2006	Dividend Q4 Estimate	$0.28	$0.33	$0.20	$0.15	$0.07	$0.17
YEAR 2007	Dividend Q1 Estimate	$0.28	$0.33	$0.20	$0.16	$0.07	$0.17
YEAR 2007	Dividend Q2 Estimate	$0.29	$0.34	$0.20	$0.16	$0.07	$0.17
YEAR 2007	Dividend Q3 Estimate	$0.29	$0.34	$0.20	$0.17	$0.07	$0.18
YEAR 2007	Dividend Q4 Estimate	$0.29	$0.34	$0.20	$0.17	$0.07	$0.18
YEAR 2008	Dividend Q1 Estimate	$0.30	$0.35	$0.20	$0.17	$0.06	$0.19
YEAR 2008	Dividend Q2 Estimate	$0.30	$0.35	$0.20	$0.18	$0.06	$0.19
YEAR 2008	Dividend Q3 Estimate	$0.30	$0.36	$0.21	$0.18	$0.06	$0.19
YEAR 2008	Dividend Q4 Estimate	$0.31	$0.36	$0.21	$0.19	$0.06	$0.20
YEAR 2009	Dividend Q1 Estimate	$0.31	$0.37	$0.21	$0.19	$0.06	$0.20
YEAR 2009	Dividend Q2 Estimate	$0.31	$0.37	$0.21	$0.20	$0.06	$0.21
YEAR 2009	Dividend Q3 Estimate	$0.32	$0.38	$0.21	$0.20	$0.06	$0.21
YEAR 2009	Dividend Q4 Estimate	$0.32	$0.38	$0.21	$0.21	$0.06	$0.22
YEAR 2010	Dividend Q1 Estimate	$0.32	$0.39	$0.21	$0.21	$0.06	$0.22
YEAR 2010	Dividend Q2 Estimate	$0.33	$0.39	$0.21	$0.21	$0.06	$0.22
YEAR 2010	Dividend Q3 Estimate	$0.34	$0.40	$0.22	$0.22	$0.07	$0.23
YEAR 2010	Dividend Q4 Estimate	$0.34	$0.40	$0.22	$0.22	$0.07	$0.23
YEAR 2011	Dividend Q1 Estimate	$0.35	$0.41	$0.22	$0.23	$0.07	$0.23
YEAR 2011	Dividend Q2 Estimate	$0.35	$0.42	$0.23	$0.23	$0.07	$0.24
YEAR 2011	Dividend Q3 Estimate	$0.36	$0.42	$0.23	$0.24	$0.07	$0.24
YEAR 2011	Dividend Q4 Estimate	$0.36	$0.43	$0.23	$0.24	$0.07	$0.25
YEAR 2012	Dividend Q1 Estimate	$0.37	$0.43	$0.24	$0.25	$0.07	$0.25
YEAR 2012	Dividend Q2 Estimate	$0.37	$0.44	$0.24	$0.25	$0.07	$0.25
YEAR 2012	Dividend Q3 Estimate	$0.38	$0.45	$0.24	$0.26	$0.07	$0.26
YEAR 2012	Dividend Q4 Estimate	$0.39	$0.45	$0.25	$0.26	$0.08	$0.26
YEAR 2013	Dividend Q1 Estimate	$0.39	$0.46	$0.25	$0.27	$0.08	$0.26
YEAR 2013	Dividend Q2 Estimate	$0.40	$0.47	$0.25	$0.27	$0.08	$0.27
YEAR 2013	Dividend Q3 Estimate	$0.40	$0.47	$0.26	$0.28	$0.08	$0.27
YEAR 2013	Dividend Q4 Estimate	$0.41	$0.48	$0.26	$0.28	$0.08	$0.28
YEAR 2014	Dividend Q1 Estimate	$0.41	$0.48	$0.26	$0.28	$0.08	$0.28
YEAR 2014	Dividend Q2 Estimate	$0.42	$0.49	$0.27	$0.29	$0.08	$0.28
YEAR 2014	Dividend Q3 Estimate	$0.43	$0.50	$0.27	$0.29	$0.08	$0.29
YEAR 2014	Dividend Q4 Estimate	$0.43	$0.50	$0.27	$0.30	$0.08	$0.29
YEAR 2015	Dividend Q1 Estimate	$0.44	$0.51	$0.28	$0.30	$0.09	$0.29
YEAR 2015	Dividend Q2 Estimate	$0.44	$0.52	$0.28	$0.30	$0.09	$0.30
YEAR 2015 Q2	Year 10 Stock Price	$44.48	$58.62	$30.79	$43.44	$18.73	$33.66
	Trial COE - Quarterly Rate	2.3%	2.2%	2.2%	2.0%	1.8%	2.2%
	Trial COE - Annual Rate	9.6%	9.1%	9.2%	8.3%	7.3%	9.1%
	Cost of Equity	9.6%	9.1%	9.2%	8.3%	7.3%	9.1%
	(Trial COE - COE) x 100	0.00	0.00	0.00	0.00	0.00	0.00

Sources and Notes:

All Growth Rate Estimates: Table No. MJV-6; Panel B.

Stock Prices and Dividends are from Compustat as of April 2005.

1. See Workpaper #1 to Table No. MJV-6 for the average closing stock price obtained from Compustat.
2. See Workpaper #2 to Table No. MJV-6 for the for the quarterly dividend obtained from Compustat.
3. The Blue Chip Long-Term GDP Growth Rate is used to calculate the Year 10 Stock Price.

{(the Dividend Year 2015 Q2 Estimate) x ((1 + the Perpetual Growth Rate) ^ (1/4))} /
{(Trial COE - Quarterly Rate) - ((1 + the Perpetual Growth Rate) ^ (1/4) -1)}.

Table No. MJV-7

Overall Cost of Capital of the 2004 Water Utility Sample

Panel A: Simple DCF Method (Quarterly)

Company	1st Quarter, 2005 Bond Rating [1]	1st Quarter, 2005 Preferred Equity Rating [2]	DCF Cost of Equity [3]	DCF Common Equity to Market Value Ratio [4]	Cost of Preferred Equity [5]	DCF Preferred Equity to Market Value Ratio [6]	Cost of Debt [7]	DCF Debt to Market Value Ratio [8]	Arizona-America Water Company's Income Tax Rate [9]	Overall After- Tax Cost of Capital [10]
American States Water Co	A	n/a	11.0%	0.56	n/a	-	5.6%	0.44	39.5%	7.6%
California Water Service Gp	A	A	9.9%	0.69	6.3%	0.00	5.6%	0.31	39.5%	7.9%
Middlesex Water Cc	A	A	10.0%	0.61	6.3%	0.01	5.6%	0.38	39.5%	7.5%
Aqua America Inc	A	n/a	12.4%	0.72	n/a	-	5.6%	0.28	39.5%	9.9%
Southwest Water Co	A	A	9.5%	0.64	6.3%	0.00	5.6%	0.36	39.5%	7.3%
York Water Co	A	n/a	10.5%	0.72	n/a	-	5.6%	0.28	39.5%	8.5%
Average [a]			10.5%	0.66	6.3%	0.00	5.6%	0.34	39.5%	8.1%
Average [b]			10.8%	0.64	6.3%	0.00	5.6%	0.35	39.5%	8.2%

Sources and Notes:

[1]: Moodys.com, Standardandpoors.com as of April 2005.
Southwest Water Co's rating is assumed.

[2]: Assumed to be the same as [1] if the company issues preferred equity.

[3]: Table No. MJV-6; Panel A, [6].

[4]: Table No. MJV-4, [1].

[5]: Mergent Bond Record, March 2005.

[6]: Table No. MJV-4, [2].

[7]: Mergent Bond Record, March 2005.

[9]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}.

[a]: Average over all companies.

[b]: Average excluding Southwest Water Co and York Water Co because
Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co
does not have a substantial amount of historical data.

Table No. MJV-7

Overall Cost of Capital of the 2004 Water Utility Sample

Panel B: Multi-Stage DCF (Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	1st Quarter, 2005 Bond Rating [1]	1st Quarter, 2005 Preferred Equity Rating [2]	DCF Cost of Equity [3]	DCF Common Equity to Market Value Ratio [4]	Cost of Preferred Equity [5]	DCF Preferred Equity to Market Value Ratio [6]	Cost of Debt [7]	DCF Debt to Market Value Ratio [8]	Arizona-America Water Company's Income Tax Rate [9]	Overall After- Tax Cost of Capital [10]
American States Water Co	A	n/a	9.6%	0.56	n/a	-	5.6%	0.44	39.5%	6.8%
California Water Service Gp	A	A	9.1%	0.69	6.3%	0.00	5.6%	0.31	39.5%	7.3%
Middlesex Water Co	A	A	9.2%	0.61	6.3%	0.01	5.6%	0.38	39.5%	7.0%
Aqua America Inc	A	n/a	8.3%	0.72	n/a	-	5.6%	0.28	39.5%	6.9%
Southwest Water Co	A	A	7.3%	0.64	6.3%	0.00	5.6%	0.36	39.5%	5.9%
York Water Co	A	n/a	9.1%	0.72	n/a	-	5.6%	0.28	39.5%	7.5%
Average [a]			8.7%	0.66	6.3%	0.00	5.6%	0.34	39.5%	6.9%
Average [b]			9.0%	0.64	6.3%	0.00	5.6%	0.35	39.5%	7.0%

Sources and Notes:

[1]: Moodys.com, Standardandpoors.com as of April 2005.
Southwest Water Co's rating is assumed.

[2]: Assumed to be the same as [1] if the company issues preferred equity.

[3]: Table No. MJV-6; Panel A, [6].

[4]: Table No. MJV-4, [1].

[5]: Mergent Bond Record, March 2005.

[6]: Table No. MJV-4, [2].

[7]: Mergent Bond Record, March 2005.

[8]: Table No. MJV-4, [3].

[9]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}.

[a]: Average over all companies.

[b]: Average excluding Southwest Water Co and York Water Co because
Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co

does not have a substantial amount of historical data.

Table No. MJV-8

DCF Cost of Equity at Paradise Valley Water Company's Capital Structure

2004 Water Utility Sample Return on Equity at the Company's Regulatory Capital Structure

	Overall Cost of Capital [1]	Paradise Valley Water Company's Regulatory % Long-Term Debt [2]	Paradise Valley Water Company's Cost of Long-Term Debt [3]	Arizona-America Water Company's Income Tax Rate [4]	Paradise Valley Water Company's Regulatory % Equity [5]	Estimated Return on Equity [6]
Average over all companies:						
Simple DCF Quarterly	8.1%	0.63	5.6%	39.5%	0.37	16.2%
Multi-Stage DCF - Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate	6.9%	0.63	5.6%	39.5%	0.37	12.9%
Average excluding Southwest Water Co and York Water Co:						
Simple DCF Quarterly	8.2%	0.63	5.6%	39.5%	0.37	16.5%
Multi-Stage DCF - Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate	7.0%	0.63	5.6%	39.5%	0.37	13.2%

Sources and Notes:
[1]: Table No. MJV-7; Panels A - B, [10].
[2] and [5]: Paradise Valley Water Company.
[3]: Workpaper #2 to Table No. MJV-10; Panel A. Based on an A rating.
[4]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[6]: {[1] - ([2] x [3] x (1 - [4]))} / [5].

Table No. MJV-9

Risk Positioning Cost of Equity of the 2004 Water Utility Sample

Panel A: Using Unadjusted Value Line Betas and the Long-Term Risk-Free Rate

	Long-Term Risk-Free Rate [1]	Unadjusted Beta on Market [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (0.5%) Cost of Equity [5]	ECAPM (1.5%) Cost of Equity [6]
American States Water Co	5.0%	0.52	6.5%	8.4%	8.6%	9.1%
California Water Service Gp	5.0%	0.60	6.5%	8.9%	9.1%	9.5%
Connecticut Water Svc Inc	5.0%	0.45	6.5%	7.9%	8.2%	8.7%
Middlesex Water Co	5.0%	0.45	6.5%	7.9%	8.2%	8.7%
Aqua America Inc	5.0%	0.60	6.5%	8.9%	9.1%	9.5%
SJW Corp	5.0%	0.30	6.5%	6.9%	7.3%	8.0%
Southwest Water Co	5.0%	0.45	6.5%	7.9%	8.2%	8.7%
York Water Co	5.0%	0.30	6.5%	6.9%	7.3%	8.0%
Average [a]	5.0%	0.46	6.5%	8.0%	8.2%	8.8%
Average [b]	5.0%	0.49	6.5%	8.2%	8.4%	8.9%

Sources and Notes:

[1]: Table No. MJV-12; Panel A.
[2]: Workpaper # 1 to Table No. MJV-9.
[3]: MJV Written Testimony, Appendix B.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 0.5%) + [2] x ([3] - 0.5%).
[6]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

[a]: Average over all companies.
[b]: Average excluding Southwest Water Co and York Water Co because Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Table No. MJV-9

Risk Positioning Cost of Equity of the 2004 Water Utility Sample

Panel B: Using Unadjusted Value Line Betas and the Short-Term Risk-Free Rate

Company	Short-Term Risk-Free Rate [1]	Unadjusted Beta on Market [2]	Short-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1%) Cost of Equity [5]	ECAPM (2%) Cost of Equity [6]	ECAPM (3%) Cost of Equity [7]
American States Water Co	3.0%	0.52	8.0%	7.2%	7.7%	8.1%	8.6%
California Water Service Gp	3.0%	0.60	8.0%	7.8%	8.2%	8.6%	9.0%
Connecticut Water Svc Inc	3.0%	0.45	8.0%	6.6%	7.1%	7.7%	8.2%
Middlesex Water Co	3.0%	0.45	8.0%	6.6%	7.1%	7.7%	8.2%
Aqua America Inc	3.0%	0.60	8.0%	7.8%	8.2%	8.6%	9.0%
SJW Corp	3.0%	0.30	8.0%	5.4%	6.1%	6.8%	7.5%
Southwest Water Co	3.0%	0.45	8.0%	6.6%	7.1%	7.7%	8.2%
York Water Co	3.0%	0.30	8.0%	5.4%	6.1%	6.8%	7.5%
Average [a]	3.0%	0.46	8.0%	6.7%	7.2%	7.7%	8.3%
Average [b]	3.0%	0.52	8.0%	7.2%	7.7%	8.1%	8.6%

Sources and Notes:

[1]: Table No. MJV-12; Panel A.
[2]: Workpaper # 1 to Table No. MJV-9.
[3]: MJV Written Testimony, Appendix B.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1%) + [2] x ([3] - 1%).
[6]: ([1] + 2%) + [2] x ([3] - 2%).
[7]: ([1] + 3%) + [2] x ([3] - 3%).

[a]: Average over all companies.
[b]: Average ofcompanies with cost of equity is greater than their cost of debt plus 25 basis point and excluding Southwest Water Co and York Water Co because Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Workpaper # 1 to Table No. MJV-9

2004 Water Utility Sample

Value Line Betas

Company	Beta as of January 28, 2005 [1]	Unadjusted Beta [2]	Beta as of January 30, 2004 [3]
American States Water Co	0.70	0.52	0.65
California Water Service Gp	0.75	0.60	0.65
Connecticut Water Svc Inc	0.65	0.45	0.60
Middlesex Water Co	0.65	0.45	0.55
Aqua America Inc	0.75	0.60	0.75
SJW Corp	0.55	0.30	0.55
Southwest Water Co	0.65	0.45	0.60
York Water Co	0.55	0.30	0.55

Sources and Notes:

[1]: Value Line beta as of January 28, 2005.

[2]: The reported beta in [1] by *Value Line* is unadjusted using the formula: ([1] - .35) / .67.

[3]: Value Line beta as of January 30, 2004.

Workpaper # 2 to Table No. MJV-9

2004 Water Utility Sample

52-Week Regression Statistics for Week Ending on 4/13/2005

Company	American States Water Co	California Water Service Gp	Connecticut Water Svc Inc	Middlesex Water Co	Aqua America Inc	Sjw Corp	Southwest Water Co	York Water Co	Average	Water Sample Portfolio
Beta	1.04	1.21	1.44	0.97	0.96	1.83	0.29	0.33	**1.01**	1.01
St. Dev	0.28	0.35	0.32	0.29	0.23	0.33	0.30	0.23	**0.29**	0.15
T-Stat	3.75	3.48	4.52	3.42	4.13	5.51	0.95	1.45	**3.47**	6.53

Sources and Notes:
Compustat as of April 2005.
Risk-free rate taken from the St. Louis Federal Reserve Bank.
Regression in Question:
(Company Returns - Risk-Free Rate) = Intercept + Beta (S&P 500 Returns - Risk-Free Rate).
Weekly data set is constructed using closing prices as of Wednesday, if available. If not available, Tuesday's closing price was taken.
The week including September 11, 2001 was excluded from this analysis.

Table No. MJV-10

Overall Cost of Capital of the 2004 Water Utility Sample

Panel A: CAPM Cost of Equity Based on Unadjusted Value Line Betas and a Long-Term Risk-Free Rate

Company	CAPM Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-America Water Company's Income Tax Rate [7]	Overall After- Tax Cost of Capital [8]
American States Water Co	8.4%	0.56	6.3%	0.00	5.6%	0.44	39.5%	6.2%
California Water Service Gp	8.9%	0.64	6.2%	0.00	5.6%	0.36	39.5%	6.9%
Connecticut Water Svc Inc	7.9%	0.74	6.3%	0.00	5.6%	0.25	39.5%	6.8%
Middlesex Water Co	7.9%	0.64	6.3%	0.01	5.6%	0.34	39.5%	6.3%
Aqua America Inc	8.9%	0.70	6.3%	0.00	5.6%	0.30	39.5%	7.2%
SJW Corp	6.9%	0.70	n/a	-	5.6%	0.30	39.5%	5.9%
Southwest Water Co	7.9%	0.66	6.3%	0.00	5.6%	0.34	39.5%	6.4%
York Water Co	6.9%	0.71	n/a	-	5.6%	0.29	39.5%	5.9%
Average [a]	8.0%	0.67	6.3%	0.00	5.6%	0.33	39.5%	6.4%
Average [b]	8.2%	0.66	6.3%	0.00	5.6%	0.33	39.5%	6.5%

Sources and Notes:

[1]: Table No. MJV-9; Panel A, [4].

[2]: Table No. MJV-4, [4].

[3]: Workpaper #2 to Table No. MJV-10; Panel B, [8].

[4]: Table No. MJV-4, [5].

[5]: Workpaper #2 to Table No. MJV-10; Panel A, [8].

[6]: Table No. MJV-4, [6].

[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.

[b]: Average excluding Southwest Water Co and York Water Co because
Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Table No. MJV-10

Overall Cost of Capital of the 2004 Water Utility Sample

Panel B: ECAPM (0.5%) Cost of Equity Based on Unadjusted Value Line Betas and a Long-Term Risk-Free Rate

Company	ECAPM (0.5%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-America Water Company's Income Tax Rate [7]	Overall After- Tax Cost of Capital [8]
American States Water Co	8.6%	0.56	6.3%	0.00	5.6%	0.44	39.5%	6.3%
California Water Service Gp	9.1%	0.64	6.2%	0.00	5.6%	0.36	39.5%	7.0%
Connecticut Water Svc Inc	8.2%	0.74	6.3%	0.00	5.6%	0.25	39.5%	7.0%
Middlesex Water Co	8.2%	0.64	6.3%	0.01	5.6%	0.34	39.5%	6.5%
Aqua America Inc	9.1%	0.70	6.3%	0.00	5.6%	0.30	39.5%	7.4%
SJW Corp	7.3%	0.70	n/a	-	5.6%	0.30	39.5%	6.1%
Southwest Water Co	8.2%	0.66	6.3%	0.00	5.6%	0.34	39.5%	6.5%
York Water Co	7.3%	0.71	n/a	-	5.6%	0.29	39.5%	6.2%
Average [a]	8.2%	0.67	6.3%	0.00	5.6%	0.33	39.5%	6.6%
Average [b]	8.4%	0.66	6.3%	0.00	5.6%	0.33	39.5%	6.7%

Sources and Notes:

[1]: Table No. MJV-9; Panel A, [5].
[2]: Table No. MJV-4, [4].
[3]: Workpaper #2 to Table No. MJV-10; Panel B, [8].
[4]: Table No. MJV-4, [5].
[5]: Workpaper #2 to Table No. MJV-10; Panel A, [8].
[6]: Table No. MJV-4, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average excluding Southwest Water Co and York Water Co because Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Table No. MJV-10

Overall Cost of Capital of the 2004 Water Utility Sample

Panel C: ECAPM (1.5%) Cost of Equity Based on Unadjusted Value Line Betas and a Long-Term Risk-Free Rate

Company	ECAPM (1.5%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-America Water Company's Income Tax Rate [7]	Overall After- Tax Cost of Capital [8]
American States Water Co	9.1%	0.56	6.3%	0.00	5.6%	0.44	39.5%	6.6%
California Water Service Gp	9.5%	0.64	6.2%	0.00	5.6%	0.36	39.5%	7.3%
Connecticut Water Svc Inc	8.7%	0.74	6.3%	0.00	5.6%	0.25	39.5%	7.4%
Middlesex Water Co	8.7%	0.64	6.3%	0.01	5.6%	0.34	39.5%	6.9%
Aqua America Inc	9.5%	0.70	6.3%	0.00	5.6%	0.30	39.5%	7.6%
SJW Corp	8.0%	0.70	n/a	-	5.6%	0.30	39.5%	6.6%
Southwest Water Co	8.7%	0.66	6.3%	0.00	5.6%	0.34	39.5%	6.9%
York Water Co	8.0%	0.71	n/a	-	5.6%	0.29	39.5%	6.7%
Average [a]	8.8%	0.67	6.3%	0.00	5.6%	0.33	39.5%	7.0%
Average [b]	8.9%	0.66	6.3%	0.00	5.6%	0.33	39.5%	7.1%

Sources and Notes:

[1]: Table No. MJV-9; Panel A, [6].

[2]: Table No. MJV-4, [4].

[3]: Workpaper #2 to Table No. MJV-10; Panel B, [8].

[4]: Table No. MJV-4, [5].

[5]: Workpaper #2 to Table No. MJV-10; Panel A, [8].

[6]: Table No. MJV-4, [6].

[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.

[b]: Average excluding Southwest Water Co and York Water Co because
Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Table No. MJV-10

Overall Cost of Capital of the 2004 Water Utility Sample

Panel D: CAPM Cost of Equity Based on Unadjusted Value Line Betas and a Short-Term Risk-Free Rate

Company	CAPM Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-America Water Company's Income Tax Rate [7]	Overall After- Tax Cost of Capital [8]
American States Water Co	7.2%	0.56	6.3%	0.00	5.6%	0.44	39.5%	5.5%
California Water Service Gp	7.8%	0.64	6.2%	0.00	5.6%	0.36	39.5%	6.2%
Connecticut Water Svc Inc	6.6%	0.74	6.3%	0.00	5.6%	0.25	39.5%	5.8%
Middlesex Water Co	6.6%	0.64	6.3%	0.01	5.6%	0.34	39.5%	5.5%
Aqua America Inc	7.8%	0.70	6.3%	0.00	5.6%	0.30	39.5%	6.4%
SJW Corp	5.4%	0.70	n/a	-	5.6%	0.30	39.5%	4.8%
Southwest Water Co	6.6%	0.66	6.3%	0.00	5.6%	0.34	39.5%	5.5%
York Water Co	5.4%	0.71	n/a	-	5.6%	0.29	39.5%	4.8%
Average [a]	6.7%	0.67	6.3%	0.00	5.6%	0.33	39.5%	5.6%
Average [b]	7.2%	0.65	6.3%	0.00	5.6%	0.34	39.5%	5.9%

Sources and Notes:

[1]: Table No. MJV-9; Panel B, [4].

[2]: Table No. MJV-4, [4].

[3]: Workpaper #2 to Table No. MJV-10; Panel B, [8].

[4]: Table No. MJV-4, [5].

[5]: Workpaper #2 to Table No. MJV-10; Panel A, [8].

[6]: Table No. MJV-4, [6].

[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.

[b]: Average ofcompanies with cost of equity is greater than their cost of debt plus 25 basis point and excluding Southwest Water Co and York Water Co because Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Table No. MJV-10

Overall Cost of Capital of the 2004 Water Utility Sample

Panel E: ECAPM (1%) Cost of Equity Based on Unadjusted Value Line Betas and a Short-Term Risk-Free Rate

Company	ECAPM (1%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-America Water Company's Income Tax Rate [7]	Overall After- Tax Cost of Capital [8]
American States Water Co	7.7%	0.56	6.3%	0.00	5.6%	0.44	39.5%	5.8%
California Water Service Gp	8.2%	0.64	6.2%	0.00	5.6%	0.36	39.5%	6.4%
Connecticut Water Svc Inc	7.1%	0.74	6.3%	0.00	5.6%	0.25	39.5%	6.2%
Middlesex Water Co	7.1%	0.64	6.3%	0.01	5.6%	0.34	39.5%	5.8%
Aqua America Inc	8.2%	0.70	6.3%	0.00	5.6%	0.30	39.5%	6.7%
SJW Corp	6.1%	0.70	n/a	-	5.6%	0.30	39.5%	5.3%
Southwest Water Co	7.1%	0.66	6.3%	0.00	5.6%	0.34	39.5%	5.9%
York Water Co	6.1%	0.71	n/a	-	5.6%	0.29	39.5%	5.3%
Average [a]	7.2%	0.67	6.3%	0.00	5.6%	0.33	39.5%	5.9%
Average [b]	7.7%	0.65	6.3%	0.00	5.6%	0.34	39.5%	6.2%

Sources and Notes:

[1]: Table No. MJV-9; Panel B, [5].
[2]: Table No. MJV-4, [4].
[3]: Workpaper #2 to Table No. MJV-10; Panel B, [8].
[4]: Table No. MJV-4, [5].
[5]: Workpaper #2 to Table No. MJV-10; Panel A, [8].
[6]: Table No. MJV-4, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average ofcompanies with cost of equity is greater than their cost of debt plus 25 basis point and excluding Southwest Water Co and York Water Co because Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Table No. MJV-10

Overall Cost of Capital of the 2004 Water Utility Sample

Panel F: ECAPM (2%) Cost of Equity Based on Unadjusted Value Line Betas and a Short-Term Risk-Free Rate

Company	ECAPM (2%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-America Water Company's Income Tax Rate [7]	Overall After- Tax Cost of Capital [8]
American States Water Co	8.1%	0.56	6.3%	0.00	5.6%	0.44	39.5%	6.0%
California Water Service Gp	8.6%	0.64	6.2%	0.00	5.6%	0.36	39.5%	6.7%
Connecticut Water Svc Inc	7.7%	0.74	6.3%	0.00	5.6%	0.25	39.5%	6.6%
Middlesex Water Co	7.7%	0.64	6.3%	0.01	5.6%	0.34	39.5%	6.2%
Aqua America Inc	8.6%	0.70	6.3%	0.00	5.6%	0.30	39.5%	7.0%
SJW Corp	6.8%	0.70	n/a	-	5.6%	0.30	39.5%	5.8%
Southwest Water Co	7.7%	0.66	6.3%	0.00	5.6%	0.34	39.5%	6.2%
York Water Co	6.8%	0.71	n/a	-	5.6%	0.29	39.5%	5.8%
Average [a]	7.7%	0.67	6.3%	0.00	5.6%	0.33	39.5%	6.3%
Average [b]	8.1%	0.65	6.3%	0.00	5.6%	0.34	39.5%	6.5%

Sources and Notes:

[1]: Table No. MJV-9; Panel B, [6].
[2]: Table No. MJV-4, [4].
[3]: Workpaper #2 to Table No. MJV-10; Panel B, [8].
[4]: Table No. MJV-4, [5].
[5]: Workpaper #2 to Table No. MJV-10; Panel A, [8].
[6]: Table No. MJV-4, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average ofcompanies with cost of equity is greater than their cost of debt plus 25 basis point and excluding Southwest Water Co and York Water Co because Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Table No. MJV-10

Overall Cost of Capital of the 2004 Water Utility Sample

Panel G: ECAPM (3%) Cost of Equity Based on Unadjusted Value Line Betas and a Short-Term Risk-Free Rate

Company	ECAPM (3%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-America Water Company's Income Tax Rate [7]	Overall After- Tax Cost of Capital [8]
American States Water Co	8.6%	0.56	6.3%	0.00	5.6%	0.44	39.5%	6.3%
California Water Service Gp	9.0%	0.64	6.2%	0.00	5.6%	0.36	39.5%	7.0%
Connecticut Water Svc Inc	8.2%	0.74	6.3%	0.00	5.6%	0.25	39.5%	7.0%
Middlesex Water Co	8.2%	0.64	6.3%	0.01	5.6%	0.34	39.5%	6.5%
Aqua America Inc	9.0%	0.70	6.3%	0.00	5.6%	0.30	39.5%	7.3%
SJW Corp	7.5%	0.70	n/a	-	5.6%	0.30	39.5%	6.2%
Southwest Water Co	8.2%	0.66	6.3%	0.00	5.6%	0.34	39.5%	6.6%
York Water Co	7.5%	0.71	n/a	-	5.6%	0.29	39.5%	6.3%
Average [a]	8.3%	0.67	6.3%	0.00	5.6%	0.33	39.5%	6.7%
Average [b]	8.6%	0.65	6.3%	0.00	5.6%	0.34	39.5%	6.8%

Sources and Notes:

[1]: Table No. MJV-9; Panel B, [7].
[2]: Table No. MJV-4, [4].
[3]: Workpaper #2 to Table No. MJV-10; Panel B, [8].
[4]: Table No. MJV-4, [5].
[5]: Workpaper #2 to Table No. MJV-10; Panel A, [8].
[6]: Table No. MJV-4, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average ofcompanies with cost of equity is greater than their cost of debt plus 25 basis point and excluding Southwest Water Co and York Water Co because Southwest Water Co has only 37% of revenues from regulated activities, and York Water Co does not have a substantial amount of historical data.

Workpaper #1 to Table No. MJV-10

2004 Water Utility Sample

Panel A: Bond Rating Summary from 2000 to 2004

						Days at Rating			
Company	Year End 2004	Year End 2003	Year End 2002	Year End 2001	Year End 2000	Aa	A	Baa	Total Days
American States Water Co	A	A	A	A	A	0	1827	0	1827
California Water Service Gp	A	A	A	Aa	Aa	1052	775	0	1827
Connecticut Water Svc Inc	A	A	A	A	A	0	1827	0	1827
Middlesex Water Co	A	A	A	A	A	0	1827	0	1827
Aqua America Inc	A	A	A	A	A	0	1827	0	1827
SJW Corp	A	A	A	A	A	0	1827	0	1827
Southwest Water Co	A	A	A	A	A	0	1827	0	1827
York Water Co	A	A	A	A	A	0	1827	0	1827

Sources and Notes:

Bond ratings for American States Water Co are obtained from www.moodys.com as of April 2005. They are the senior unsecured rating for the subsidiary Southern California Water Company.

Bond ratings for California Water Service Co are obtained from www.moodys.com as of April 2005. They are the first mortgage bond rating for said company.

Bond ratings for Connecticut Water Svc Inc are obtained from www.standardandpoors.com as of April 2005 from September 2003 onward. They are assumed to be the same from 2000 to August 2003.

Bond ratings for Middlesex Water Co are obtained from www.standardandpoors.com as of April 2005.

Bond ratings for Aqua America Inc are obtained from www.standardandpoors.com as of April 2005. They are the credit rating for the subsidiary Aqua Pennsylvania from January 2002 onward. They are assumed to be the same from 2000 to December 2001.

Bond ratings for SJW Corp are set equal to A as no rating information was found.

Bond rating for Southwest Water Co are set equal to A as no rating information was found.

Bond ratings for York Water Co are obtained from www.standardandpoors.com as of April 2005 from March 2004 onward. They are assumed to be the same from 2000 to February 2004.

Workpaper #1 to Table No. MJV-10

2004 Water Utility Sample

Panel B: Preferred Equity Rating Summary from 2000 to 2004

						Days at Rating			
Company	Year End 2004	Year End 2003	Year End 2002	Year End 2001	Year End 2000	Aa	A	Baa	Total Days
American States Water Co	n/a	n/a	n/a	A	A	0	731	0	731
California Water Service Gp	A	A	A	Aa	Aa	1052	775	0	1827
Connecticut Water Svc Inc	A	A	A	A	A	0	1827	0	1827
Middlesex Water Co	A	A	A	A	A	0	1827	0	1827
Aqua America Inc	n/a	n/a	A	A	A	0	1096	0	1096
SJW Corp	n/a	n/a	n/a	n/a	n/a	0	0	0	n/a
Southwest Water Co	A	A	A	A	A	0	1827	0	1827
York Water Co	n/a	n/a	n/a	n/a	n/a	0	0	0	n/a

Sources and Notes:

Preferred ratings are assumed to be equal to bond ratings.

The change date for American States Water Co is assumed to be 1/1/2002, and the change date for Aqua America Inc is assumed to be 1/1/2003.

Workpaper #2 to Table No. MJV-10

2004 Water Utility Sample

Panel A: Bond Yield Summary, 2000 to 2004

	% Days at Rating				Current Bond Yields			
Company	Aa [1]	A [2]	Baa [3]	Total [4]	Aa [5]	A [6]	Baa [7]	5-Year Weighted Average Bond Yield [8]
American States Water Co	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
California Water Service Gp	58%	42%	0%	100%	5.55%	5.61%	5.76%	5.58%
Connecticut Water Svc Inc	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
Middlesex Water Co	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
Aqua America Inc	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
SJW Corp	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
Southwest Water Co	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
York Water Co	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%

Sources and Notes:
[1] - [3]: Calculated from Workpaper #1 to Table No. MJV-10; Panel A.
[4]: [1] + [2] + [3].
[5] - [7]: Mergent Bond Record, March 2005.
[8]: [1] x [5] + [2] x [6] + [3] x [7].

Workpaper #2 to Table No. MJV-10

2004 Water Utility Sample

Panel B: Preferred Equity Yield Summary, 2000 to 2004

	% Days at Rating				Preferred Equity Yields			
Company	Aa [1]	A [2]	Baa [3]	Total [4]	Aa [5]	A [6]	Baa [7]	5-Year Weighted Average Preferred Yield [8]
American States Water Co	0%	100%	0%	100%	6.22%	6.29%	6.36%	6.29%
California Water Service Gp	58%	42%	0%	100%	6.22%	6.29%	6.36%	6.25%
Connecticut Water Svc Inc	0%	100%	0%	100%	6.22%	6.29%	6.36%	6.29%
Middlesex Water Co	0%	100%	0%	100%	6.22%	6.29%	6.36%	6.29%
Aqua America Inc	0%	100%	0%	100%	6.22%	6.29%	6.36%	6.29%
SJW Corp	n/a	n/a	n/a	n/a	6.22%	6.29%	6.36%	n/a
Southwest Water Co	0%	100%	0%	100%	6.22%	6.29%	6.36%	6.29%
York Water Co	n/a	n/a	n/a	n/a	6.22%	6.29%	6.36%	n/a

Sources and Notes:
[1] - [3]: Calculated from Workpaper #1 to Table No. MJV-10; Panel B.
[4]: [1] + [2] + [3].
[5]: [6] - ([7] - [6]).
[6] - [7]: Mergent Bond Record, March 2005.
[8]: [1] x [5] + [2] x [6] + [3] x [7].

Table No. MJV-11

Risk Positioning Cost of Equity at Paradise Valley Water Company's Capital Structure

2004 Water Utility Sample Return on Equity at the Company's Regulatory Capital Structure

Panel A: 2004 Water Utility Sample
Using All Companies

	Overall Cost of Capital [1]	Paradise Valley Water Company's Regulatory % Long-Term Debt [2]	Paradise Valley Water Company's Cost of Long-Term Debt [3]	Arizona-America Water Company's Income Tax Rate [4]	Paradise Valley Water Company's Regulatory % Equity [5]	Estimated Return on Equity [6]
Using Long-Term Risk-Free rates:						
CAPM using Unadjusted Value Line Betas	6.4%	0.63	5.6%	39.5%	0.37	11.7%
ECAPM (0.5%) using Unadjusted Value Line Betas	6.6%	0.63	5.6%	39.5%	0.37	12.2%
ECAPM (1.5%) using Unadjusted Value Line Betas	7.0%	0.63	5.6%	39.5%	0.37	13.2%
Using Short-Term Risk-Free rates:						
CAPM using Unadjusted Value Line Betas	5.6%	0.63	5.6%	39.5%	0.37	9.3%
ECAPM (1.0%) using Unadjusted Value Line Betas	5.9%	0.63	5.6%	39.5%	0.37	10.3%
ECAPM (2.0%) using Unadjusted Value Line Betas	6.3%	0.63	5.6%	39.5%	0.37	11.3%
ECAPM (3.0%) using Unadjusted Value Line Betas	6.7%	0.63	5.6%	39.5%	0.37	12.3%

Sources and Notes:

[1]: Table No. MJV-10; Panels A - G, [8].

[2] and [5]: Paradise Valley Water Company.

[3]: Workpaper #2 to Table No. MJV-10, Panel A. Based on an A rating.

[4]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[6]: {[1] - ([2] x [3] x (1 - [4]))} / [5].

Table No. MJV-11

Risk Positioning Cost of Equity at Paradise Valley Water Company's Capital Structure

2004 Water Utility Sample Return on Equity at the Company's Regulatory Capital Structure

Panel B: 2004 Water Utility Sample

Using Companies With Cost of Equity Greater than Cost of Debt Plus 25 Basis Points and Excluding Southwest Water Co and York Water Co.

	Overall Cost of Capital [1]	Paradise Valley Water Company's Regulatory % Long-Term Debt [2]	Paradise Valley Water Company's Cost of Long-Term Debt [3]	Arizona-America Water Company's Income Tax Rate [4]	Paradise Valley Water Company's Regulatory % Equity [5]	Estimated Return on Equity [6]
Using Long-Term Risk-Free rates:						
CAPM using Unadjusted Value Line Betas	6.5%	0.63	5.6%	39.5%	0.37	12.0%
ECAPM (0.5%) using Unadjusted Value Line Betas	6.7%	0.63	5.6%	39.5%	0.37	12.4%
ECAPM (1.5%) using Unadjusted Value Line Betas	7.1%	0.63	5.6%	39.5%	0.37	13.4%
Using Short-Term Risk-Free rates:						
CAPM using Unadjusted Value Line Betas	5.9%	0.63	5.6%	39.5%	0.37	10.2%
ECAPM (1.0%) using Unadjusted Value Line Betas	6.2%	0.63	5.6%	39.5%	0.37	11.0%
ECAPM (2.0%) using Unadjusted Value Line Betas	6.5%	0.63	5.6%	39.5%	0.37	11.9%
ECAPM (3.0%) using Unadjusted Value Line Betas	6.8%	0.63	5.6%	39.5%	0.37	12.7%

Sources and Notes:

[1]: Table No. MJV-10; Panels A - G, [8].

[2] and [5]: Paradise Valley Water Company.

[3]: Workpaper #2 to Table No. MJV-10, Panel A. Based on an A rating.

[4]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate: {35% + (1 - 35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[6]: {[1] - ([2] x [3] x (1 - [4]))} / [5].

Table No. MJV-12

Panel A: US Interest Rate Series (All Constant Maturity Series)

Trade Date	30 Day	90 Day	180 Day	1 Year	2 Year	3 Year	5 Year	7 Year	10 Year	Long Term
2005-03-28	2.69%	2.84%	3.19%	3.43%	3.90%	4.09%	4.33%	4.48%	4.64%	5.01%
2005-03-29	2.70%	2.84%	3.17%	3.41%	3.87%	4.05%	4.30%	4.44%	4.60%	4.98%
2005-03-30	2.71%	2.83%	3.15%	3.39%	3.86%	4.03%	4.26%	4.40%	4.56%	4.93%
2005-03-31	2.63%	2.79%	3.13%	3.35%	3.80%	3.96%	4.18%	4.33%	4.50%	4.88%
2005-04-01	2.66%	2.80%	3.13%	3.34%	3.75%	3.90%	4.13%	4.29%	4.46%	4.85%
2005-04-04	2.64%	2.80%	3.14%	3.34%	3.74%	3.90%	4.13%	4.30%	4.47%	4.84%
2005-04-05	2.63%	2.79%	3.13%	3.34%	3.75%	3.91%	4.15%	4.31%	4.48%	4.87%
2005-04-06	2.60%	2.76%	3.11%	3.31%	3.70%	3.86%	4.09%	4.26%	4.44%	4.85%
2005-04-07	2.61%	2.77%	3.12%	3.32%	3.72%	3.89%	4.13%	4.30%	4.49%	4.90%
2005-04-08	2.61%	2.79%	3.14%	3.35%	3.77%	3.94%	4.17%	4.32%	4.50%	4.88%
2005-04-11	2.60%	2.76%	3.17%	3.37%	3.75%	3.91%	4.13%	4.28%	4.45%	4.84%
2005-04-12	2.62%	2.76%	3.16%	3.34%	3.71%	3.85%	4.05%	4.20%	4.38%	4.78%
2005-04-13	2.62%	2.77%	3.15%	3.32%	3.66%	3.83%	4.03%	4.20%	4.38%	4.80%
2005-04-14	2.62%	2.78%	3.14%	3.30%	3.60%	3.76%	3.99%	4.17%	4.37%	4.80%
2005-04-15	2.63%	2.79%	3.12%	3.26%	3.54%	3.68%	3.90%	4.09%	4.27%	4.73%
Average	2.64%	2.79%	3.14%	3.34%	3.74%	3.90%	4.13%	4.29%	4.47%	4.86%

Sources and Notes:
St. Louis Federal Bank.

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
Jan-80	11.14	11.09	11.56	11.88	12.42	-0.05	0.42	0.74	1.28	-0.05	0.42	0.74	1.28
Feb-80	11.86	12.38	12.73	12.99	13.57	0.52	0.87	1.13	1.71	0.23	0.64	0.93	1.49
Mar-80	12.39	12.96	13.51	13.97	14.45	0.57	1.12	1.58	2.06	0.34	0.80	1.15	1.68
Apr-80	10.76	12.04	13.06	13.55	14.19	1.28	2.30	2.79	3.43	0.58	1.18	1.56	2.12
May-80	10.37	10.99	11.91	12.35	13.17	0.62	1.54	1.98	2.80	0.59	1.25	1.64	2.26
Jun-80	10.06	10.58	11.39	11.89	12.71	0.52	1.33	1.83	2.65	0.58	1.26	1.67	2.32
Jul-80	10.74	11.07	11.43	11.95	12.65	0.33	0.69	1.21	1.91	0.54	1.18	1.61	2.26
Aug-80	11.40	11.64	12.09	12.44	13.15	0.24	0.69	1.04	1.75	0.50	1.12	1.54	2.20
Sep-80	11.85	12.02	12.52	12.97	13.70	0.17	0.67	1.12	1.85	0.47	1.07	1.49	2.16
Oct-80	12.31	12.31	12.68	13.05	14.23	0.00	0.37	0.74	1.92	0.42	1.00	1.42	2.14
Nov-80	12.30	12.97	13.34	13.59	14.64	0.67	1.04	1.29	2.34	0.44	1.00	1.40	2.15
Dec-80	11.99	13.21	13.78	14.03	15.14	1.22	1.79	2.04	3.15	0.51	1.07	1.46	2.24
Jan-81	12.11	12.81	13.52	13.83	15.03	0.70	1.41	1.72	2.92	0.52	1.10	1.48	2.29
Feb-81	12.83	13.35	13.89	14.27	15.37	0.52	1.06	1.44	2.54	0.52	1.09	1.48	2.31
Mar-81	12.48	13.33	13.90	14.47	15.34	0.85	1.42	1.99	2.86	0.54	1.12	1.51	2.35
Apr-81	13.32	13.88	14.39	14.82	15.56	0.56	1.07	1.50	2.24	0.55	1.11	1.51	2.34
May-81	12.65	14.32	14.88	15.43	15.95	1.67	2.23	2.78	3.30	0.61	1.18	1.58	2.40
Jun-81	13.04	13.75	14.41	15.08	15.80	0.71	1.37	2.04	2.76	0.62	1.19	1.61	2.42
Jul-81	13.70	14.38	14.79	15.36	16.17	0.68	1.09	1.66	2.47	0.62	1.18	1.61	2.42
Aug-81	14.45	14.89	15.42	15.76	16.34	0.44	0.97	1.31	1.89	0.61	1.17	1.60	2.39
Sep-81	14.82	15.49	15.95	16.36	16.92	0.67	1.13	1.54	2.10	0.61	1.17	1.59	2.38
Oct-81	13.84	15.40	15.82	16.47	17.11	1.56	1.98	2.63	3.27	0.66	1.21	1.64	2.42
Nov-81	12.20	14.22	14.97	15.82	16.39	2.02	2.77	3.62	4.19	0.72	1.28	1.73	2.50
Dec-81	13.34	14.23	15.00	15.75	16.55	0.89	1.66	2.41	3.21	0.72	1.29	1.76	2.53
Jan-82	14.15	15.18	15.75	16.19	17.10	1.03	1.60	2.04	2.95	0.74	1.30	1.77	2.54
Feb-82	14.02	15.27	15.72	16.35	17.18	1.25	1.70	2.33	3.16	0.76	1.32	1.79	2.57
Mar-82	13.87	14.58	15.21	16.12	16.82	0.72	1.35	2.26	2.96	0.75	1.32	1.81	2.58
Apr-82	13.48	14.46	14.90	15.95	16.78	0.98	1.42	2.47	3.30	0.76	1.32	1.83	2.61
May-82	13.58	14.26	14.77	15.70	16.64	0.68	1.19	2.12	3.06	0.76	1.32	1.84	2.62
Jun-82	14.12	14.81	15.26	16.07	16.92	0.69	1.14	1.95	2.80	0.76	1.31	1.84	2.63
Jul-82	13.52	14.61	15.21	16.20	16.80	1.09	1.69	2.68	3.28	0.77	1.33	1.87	2.65
Aug-82	12.54	13.71	14.48	15.70	16.32	1.17	1.94	3.16	3.78	0.78	1.34	1.91	2.68
Sep-82	11.83	12.94	13.72	15.07	15.63	1.11	1.89	3.24	3.80	0.79	1.36	1.95	2.72
Oct-82	11.12	12.12	12.97	14.34	14.73	1.00	1.85	3.22	3.61	0.80	1.38	1.99	2.74
Nov-82	11.25	11.68	12.51	13.81	14.30	0.43	1.26	2.56	3.05	0.79	1.37	2.00	2.75
Dec-82	10.95	11.83	12.44	13.66	14.14	0.88	1.49	2.71	3.19	0.79	1.38	2.02	2.77
Jan-83	11.13	11.79	12.35	13.53	13.94	0.66	1.22	2.40	2.81	0.79	1.37	2.03	2.77
Feb-83	10.60	12.01	12.58	13.52	13.95	1.41	1.98	2.92	3.35	0.80	1.39	2.06	2.78
Mar-83	10.83	11.73	12.32	13.15	13.61	0.90	1.49	2.32	2.78	0.80	1.39	2.06	2.78
Apr-83	10.51	11.51	12.06	12.86	13.29	1.00	1.55	2.35	2.78	0.81	1.39	2.07	2.78
May-83	11.12	11.46	11.95	12.68	13.09	0.34	0.83	1.56	1.97	0.80	1.38	2.06	2.76
Jun-83	11.19	11.74	12.15	12.88	13.37	0.55	0.96	1.69	2.18	0.79	1.37	2.05	2.75
Jul-83	11.98	12.15	12.39	12.99	13.39	0.17	0.41	1.01	1.41	0.78	1.35	2.03	2.72

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
Aug-83	12.10	12.51	12.72	13.17	13.64	0.41	0.62	1.07	1.54	0.77	1.33	2.00	2.69
Sep-83	11.57	12.37	12.62	13.11	13.55	0.80	1.05	1.54	1.98	0.77	1.32	1.99	2.67
Oct-83	11.88	12.25	12.49	12.97	13.46	0.37	0.61	1.09	1.58	0.76	1.31	1.97	2.65
Nov-83	11.76	12.41	12.61	13.09	13.61	0.65	0.85	1.33	1.85	0.76	1.30	1.96	2.63
Dec-83	11.97	12.57	12.76	13.21	13.75	0.60	0.79	1.24	1.78	0.76	1.29	1.95	2.62
Jan-84	11.80	12.20	12.71	13.13	13.65	0.40	0.91	1.33	1.85	0.75	1.28	1.93	2.60
Feb-84	12.17	12.08	12.70	13.11	13.59	-0.09	0.53	0.94	1.42	0.73	1.27	1.91	2.58
Mar-84	12.53	12.57	13.22	13.54	13.99	0.04	0.69	1.01	1.46	0.72	1.25	1.90	2.55
Apr-84	12.84	12.81	13.48	13.77	14.31	-0.03	0.64	0.93	1.47	0.70	1.24	1.88	2.53
May-84	13.81	13.28	14.10	14.37	14.74	-0.53	0.29	0.56	0.93	0.68	1.23	1.85	2.50
Jun-84	13.74	13.55	14.33	14.66	15.05	-0.19	0.59	0.92	1.31	0.66	1.21	1.83	2.48
Jul-84	12.93	13.44	14.12	14.57	15.15	0.51	1.19	1.64	2.22	0.66	1.21	1.83	2.48
Aug-84	12.70	12.87	13.47	14.13	14.63	0.17	0.77	1.43	1.93	0.65	1.20	1.82	2.47
Sep-84	12.35	12.66	13.27	13.94	14.35	0.31	0.92	1.59	2.00	0.65	1.20	1.82	2.46
Oct-84	11.73	12.63	13.11	13.61	13.94	0.90	1.38	1.88	2.21	0.65	1.20	1.82	2.45
Nov-84	11.69	12.29	12.66	13.09	13.48	0.60	0.97	1.40	1.79	0.65	1.20	1.81	2.44
Dec-84	11.70	12.13	12.50	12.92	13.40	0.43	0.80	1.22	1.70	0.65	1.19	1.80	2.43
Jan-85	11.27	12.08	12.43	12.80	13.26	0.81	1.16	1.53	1.99	0.65	1.19	1.80	2.42
Feb-85	12.09	12.13	12.49	12.80	13.23	0.04	0.40	0.71	1.14	0.64	1.18	1.78	2.40
Mar-85	11.81	12.56	12.91	13.36	13.69	0.75	1.10	1.55	1.88	0.64	1.18	1.78	2.39
Apr-85	11.62	12.23	12.69	13.14	13.51	0.61	1.07	1.52	1.89	0.64	1.18	1.77	2.39
May-85	10.62	11.72	12.30	12.70	13.15	1.10	1.68	2.08	2.53	0.65	1.18	1.78	2.39
Jun-85	10.55	10.94	11.46	11.98	12.40	0.39	0.91	1.43	1.85	0.64	1.18	1.77	2.38
Jul-85	10.91	10.97	11.42	11.92	12.43	0.06	0.51	1.01	1.52	0.63	1.17	1.76	2.37
Aug-85	10.68	11.05	11.47	12.00	12.50	0.37	0.79	1.32	1.82	0.63	1.16	1.76	2.36
Sep-85	10.82	11.07	11.46	11.99	12.48	0.25	0.64	1.17	1.66	0.63	1.16	1.75	2.35
Oct-85	10.51	11.02	11.45	11.94	12.36	0.51	0.94	1.43	1.85	0.62	1.15	1.74	2.34
Nov-85	10.11	10.55	11.07	11.54	11.99	0.44	0.96	1.43	1.88	0.62	1.15	1.74	2.34
Dec-85	9.56	10.16	10.63	11.19	11.58	0.60	1.07	1.63	2.02	0.62	1.15	1.74	2.33
Jan-86	9.58	10.05	10.46	11.04	11.44	0.47	0.88	1.46	1.86	0.62	1.15	1.73	2.33
Feb-86	8.41	9.67	10.13	10.67	11.11	1.26	1.72	2.26	2.70	0.63	1.15	1.74	2.33
Mar-86	7.66	9.00	9.49	10.15	10.49	1.34	1.83	2.49	2.83	0.64	1.16	1.75	2.34
Apr-86	7.82	8.79	9.21	9.83	10.19	0.97	1.39	2.01	2.37	0.64	1.17	1.75	2.34
May-86	8.48	9.09	9.43	9.94	10.29	0.61	0.95	1.46	1.81	0.64	1.16	1.75	2.33
Jun-86	7.90	9.13	9.49	9.96	10.34	1.23	1.59	2.06	2.44	0.65	1.17	1.75	2.33
Jul-86	8.09	8.88	9.28	9.76	10.16	0.79	1.19	1.67	2.07	0.65	1.17	1.75	2.33
Aug-86	7.63	8.72	9.22	9.64	10.18	1.09	1.59	2.01	2.55	0.66	1.17	1.76	2.33
Sep-86	8.27	8.89	9.36	9.73	10.20	0.62	1.09	1.46	1.93	0.66	1.17	1.75	2.33
Oct-86	8.03	8.86	9.33	9.72	10.24	0.83	1.30	1.69	2.21	0.66	1.17	1.75	2.32
Nov-86	7.79	8.68	9.20	9.51	10.07	0.89	1.41	1.72	2.28	0.66	1.18	1.75	2.32
Dec-86	7.89	8.49	9.02	9.41	9.97	0.60	1.13	1.52	2.08	0.66	1.18	1.75	2.32
Jan-87	7.78	8.36	8.86	9.23	9.72	0.58	1.08	1.45	1.94	0.66	1.18	1.74	2.32
Feb-87	7.63	8.38	8.88	9.20	9.65	0.75	1.25	1.57	2.02	0.66	1.18	1.74	2.31

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
Mar-87	7.95	8.36	8.84	9.13	9.61	0.41	0.89	1.18	1.66	0.66	1.17	1.74	2.31
Apr-87	8.59	8.85	9.15	9.36	10.04	0.26	0.56	0.77	1.45	0.65	1.17	1.73	2.30
May-87	8.80	9.33	9.59	9.83	10.51	0.53	0.79	1.03	1.71	0.65	1.16	1.72	2.29
Jun-87	8.77	9.32	9.65	9.98	10.52	0.55	0.88	1.21	1.75	0.65	1.16	1.71	2.28
Jul-87	9.07	9.42	9.64	10.00	10.61	0.35	0.57	0.93	1.54	0.65	1.15	1.70	2.28
Aug-87	9.36	9.67	9.86	10.20	10.80	0.31	0.50	0.84	1.44	0.64	1.15	1.69	2.27
Sep-87	9.92	10.18	10.35	10.72	11.31	0.26	0.43	0.80	1.39	0.64	1.14	1.68	2.26
Oct-87	9.26	10.52	10.74	10.98	11.62	1.26	1.48	1.72	2.36	0.65	1.14	1.68	2.26
Nov-87	9.31	10.01	10.27	10.63	11.23	0.70	0.96	1.32	1.92	0.65	1.14	1.68	2.25
Dec-87	9.20	10.11	10.33	10.62	11.29	0.91	1.13	1.42	2.09	0.65	1.14	1.68	2.25
Jan-88	8.52	9.88	10.09	10.43	11.07	1.36	1.57	1.91	2.55	0.66	1.14	1.68	2.26
Feb-88	8.54	9.40	9.60	9.94	10.62	0.86	1.06	1.40	2.08	0.66	1.14	1.68	2.25
Mar-88	9.01	9.39	9.59	9.89	10.57	0.38	0.58	0.88	1.56	0.66	1.14	1.67	2.25
Apr-88	9.29	9.67	9.86	10.17	10.90	0.38	0.57	0.88	1.61	0.65	1.13	1.66	2.24
May-88	9.52	9.90	10.10	10.41	11.04	0.38	0.58	0.89	1.52	0.65	1.13	1.65	2.23
Jun-88	9.17	9.86	10.13	10.42	11.00	0.69	0.96	1.25	1.83	0.65	1.12	1.65	2.23
Jul-88	9.47	9.96	10.26	10.55	11.11	0.49	0.79	1.08	1.64	0.65	1.12	1.64	2.22
Aug-88	9.50	10.11	10.37	10.63	11.21	0.61	0.87	1.13	1.71	0.65	1.12	1.64	2.22
Sep-88	9.17	9.82	10.06	10.34	10.90	0.65	0.89	1.17	1.73	0.65	1.12	1.63	2.21
Oct-88	8.89	9.51	9.71	9.99	10.41	0.62	0.82	1.10	1.52	0.65	1.11	1.63	2.21
Nov-88	9.23	9.45	9.72	9.99	10.48	0.22	0.49	0.76	1.25	0.64	1.11	1.62	2.20
Dec-88	9.19	9.57	9.81	10.11	10.65	0.39	0.63	0.92	1.47	0.64	1.10	1.62	2.19
Jan-89	9.03	9.62	9.81	10.10	10.65	0.59	0.78	1.07	1.62	0.64	1.10	1.61	2.19
Feb-89	9.35	9.64	9.83	10.13	10.61	0.29	0.48	0.78	1.26	0.64	1.09	1.60	2.18
Mar-89	9.29	9.80	9.98	10.27	10.67	0.51	0.69	0.98	1.38	0.64	1.09	1.60	2.17
Apr-89	9.18	9.79	9.94	10.20	10.61	0.61	0.76	1.02	1.43	0.64	1.09	1.59	2.16
May-89	8.78	9.57	9.75	10.00	10.46	0.79	0.97	1.22	1.68	0.64	1.09	1.59	2.16
Jun-89	8.22	9.10	9.29	9.59	10.03	0.89	1.08	1.38	1.82	0.64	1.09	1.59	2.16
Jul-89	8.01	8.93	9.14	9.42	9.87	0.92	1.13	1.41	1.86	0.64	1.09	1.59	2.15
Aug-89	8.41	8.96	9.14	9.45	9.88	0.55	0.73	1.04	1.47	0.64	1.08	1.58	2.15
Sep-89	8.47	9.01	9.23	9.51	9.91	0.54	0.76	1.04	1.44	0.64	1.08	1.58	2.14
Oct-89	8.10	8.92	9.19	9.44	9.81	0.82	1.09	1.34	1.71	0.64	1.08	1.57	2.14
Nov-89	8.08	8.89	9.14	9.42	9.81	0.81	1.06	1.34	1.73	0.64	1.08	1.57	2.14
Dec-89	8.16	8.86	9.11	9.39	9.82	0.70	0.95	1.23	1.66	0.64	1.08	1.57	2.13
Jan-90	8.65	8.99	9.27	9.54	9.94	0.34	0.62	0.89	1.29	0.64	1.08	1.56	2.12
Feb-90	8.76	9.22	9.44	9.75	10.14	0.46	0.68	0.99	1.38	0.64	1.07	1.56	2.12
Mar-90	8.89	9.37	9.51	9.82	10.21	0.48	0.62	0.93	1.32	0.64	1.07	1.55	2.11
Apr-90	9.24	9.46	9.64	9.89	10.30	0.22	0.40	0.65	1.06	0.64	1.06	1.55	2.10
May-90	8.83	9.47	9.70	9.89	10.41	0.64	0.87	1.06	1.58	0.64	1.06	1.54	2.10
Jun-90	8.64	9.26	9.49	9.70	10.22	0.62	0.85	1.06	1.58	0.64	1.06	1.54	2.10
Jul-90	8.60	9.24	9.47	9.69	10.20	0.64	0.87	1.09	1.60	0.64	1.06	1.54	2.09
Aug-90	9.20	9.41	9.63	9.89	10.41	0.21	0.43	0.69	1.21	0.63	1.05	1.53	2.08
Sep-90	9.14	9.56	9.77	10.09	10.64	0.42	0.63	0.95	1.50	0.63	1.05	1.52	2.08

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
Oct-90	8.98	9.53	9.77	10.06	10.74	0.55	0.79	1.08	1.76	0.63	1.05	1.52	2.08
Nov-90	8.58	9.30	9.59	9.88	10.62	0.72	1.01	1.30	2.04	0.63	1.05	1.52	2.08
Dec-90	8.44	9.05	9.39	9.64	10.43	0.61	0.95	1.20	1.99	0.63	1.05	1.52	2.08
Jan-91	8.37	9.04	9.37	9.61	10.45	0.67	1.00	1.24	2.08	0.63	1.05	1.51	2.08
Feb-91	8.41	8.83	9.16	9.38	10.07	0.42	0.75	0.97	1.66	0.63	1.05	1.51	2.07
Mar-91	8.44	8.93	9.21	9.50	10.09	0.49	0.77	1.06	1.65	0.63	1.04	1.51	2.07
Apr-91	8.37	8.86	9.12	9.39	9.94	0.49	0.75	1.02	1.57	0.63	1.04	1.50	2.07
May-91	8.45	8.86	9.15	9.41	9.86	0.41	0.70	0.96	1.41	0.63	1.04	1.50	2.06
Jun-91	8.60	9.01	9.28	9.55	9.96	0.41	0.68	0.95	1.36	0.62	1.04	1.50	2.06
Jul-91	8.50	9.00	9.25	9.51	9.89	0.50	0.75	1.01	1.39	0.62	1.03	1.49	2.05
Aug-91	8.18	8.75	8.99	9.26	9.65	0.57	0.81	1.08	1.47	0.62	1.03	1.49	2.05
Sep-91	7.90	8.61	8.86	9.11	9.51	0.71	0.96	1.21	1.61	0.62	1.03	1.49	2.04
Oct-91	7.91	8.55	8.83	9.08	9.49	0.64	0.92	1.17	1.58	0.62	1.03	1.48	2.04
Nov-91	7.89	8.48	8.78	9.01	9.45	0.59	0.89	1.12	1.56	0.62	1.03	1.48	2.04
Dec-91	7.30	8.31	8.61	8.82	9.26	1.01	1.31	1.52	1.96	0.63	1.03	1.48	2.04
Jan-92	7.76	8.20	8.51	8.72	9.13	0.44	0.75	0.96	1.37	0.62	1.03	1.48	2.03
Feb-92	7.77	8.29	8.67	8.83	9.23	0.52	0.90	1.06	1.46	0.62	1.03	1.48	2.03
Mar-92	7.97	8.35	8.73	8.89	9.25	0.38	0.76	0.92	1.28	0.62	1.03	1.47	2.02
Apr-92	8.03	8.33	8.69	8.87	9.21	0.30	0.66	0.84	1.18	0.62	1.02	1.47	2.02
May-92	7.81	8.28	8.63	8.81	9.13	0.47	0.82	1.00	1.32	0.62	1.02	1.46	2.01
Jun-92	7.65	8.22	8.56	8.70	9.05	0.57	0.91	1.05	1.40	0.62	1.02	1.46	2.01
Jul-92	7.26	8.07	8.37	8.49	8.84	0.81	1.11	1.23	1.58	0.62	1.02	1.46	2.01
Aug-92	7.25	7.95	8.21	8.34	8.65	0.70	0.96	1.09	1.40	0.62	1.02	1.46	2.00
Sep-92	7.10	7.92	8.17	8.31	8.62	0.82	1.07	1.21	1.52	0.62	1.02	1.46	2.00
Oct-92	7.41	7.99	8.32	8.49	8.84	0.58	0.91	1.08	1.43	0.62	1.02	1.45	2.00
Nov-92	7.48	8.10	8.40	8.58	8.96	0.62	0.92	1.10	1.48	0.62	1.02	1.45	1.99
Dec-92	7.26	7.98	8.24	8.37	8.81	0.72	0.98	1.11	1.55	0.62	1.02	1.45	1.99
Jan-93	7.25	7.91	8.11	8.26	8.67	0.66	0.86	1.01	1.42	0.62	1.02	1.45	1.99
Feb-93	6.98	7.71	7.90	8.03	8.39	0.73	0.92	1.05	1.41	0.62	1.02	1.44	1.98
Mar-93	7.02	7.58	7.72	7.86	8.15	0.56	0.70	0.84	1.13	0.62	1.02	1.44	1.98
Apr-93	7.01	7.46	7.62	7.80	8.14	0.45	0.61	0.79	1.13	0.62	1.02	1.44	1.97
May-93	7.01	7.43	7.61	7.85	8.21	0.42	0.60	0.84	1.20	0.62	1.01	1.43	1.97
Jun-93	6.68	7.33	7.51	7.74	8.07	0.65	0.83	1.06	1.39	0.62	1.01	1.43	1.96
Jul-93	6.56	7.17	7.35	7.53	7.93	0.61	0.79	0.97	1.37	0.62	1.01	1.43	1.96
Aug-93	6.23	6.85	7.06	7.25	7.60	0.62	0.83	1.02	1.37	0.62	1.01	1.43	1.96
Sep-93	6.27	6.66	6.85	7.05	7.34	0.39	0.58	0.78	1.07	0.62	1.01	1.42	1.95
Oct-93	6.23	6.67	6.87	7.04	7.31	0.44	0.64	0.81	1.08	0.62	1.00	1.42	1.95
Nov-93	6.51	6.93	7.12	7.29	7.66	0.42	0.61	0.78	1.15	0.62	1.00	1.41	1.94
Dec-93	6.54	6.93	7.12	7.31	7.69	0.39	0.58	0.77	1.15	0.62	1.00	1.41	1.94
Jan-94	6.37	6.93	7.12	7.30	7.65	0.56	0.75	0.93	1.28	0.61	1.00	1.41	1.93
Feb-94	6.82	7.08	7.29	7.44	7.76	0.26	0.47	0.62	0.94	0.61	0.99	1.40	1.93
Mar-94	7.25	7.48	7.69	7.82	8.13	0.23	0.44	0.57	0.88	0.61	0.99	1.40	1.92
Apr-94	7.45	7.88	8.08	8.22	8.52	0.43	0.63	0.77	1.07	0.61	0.99	1.39	1.91

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
May-94	7.59	7.99	8.19	8.32	8.62	0.40	0.60	0.73	1.03	0.61	0.99	1.39	1.91
Jun-94	7.74	7.97	8.17	8.31	8.65	0.23	0.43	0.57	0.91	0.61	0.98	1.39	1.90
Jul-94	7.46	8.11	8.31	8.44	8.80	0.65	0.85	0.98	1.34	0.61	0.98	1.38	1.90
Aug-94	7.61	8.07	8.25	8.38	8.74	0.46	0.64	0.77	1.13	0.61	0.98	1.38	1.90
Sep-94	8.00	8.34	8.49	8.61	8.98	0.34	0.49	0.61	0.98	0.60	0.98	1.38	1.89
Oct-94	8.09	8.57	8.71	8.82	9.20	0.48	0.62	0.73	1.11	0.60	0.98	1.37	1.89
Nov-94	8.08	8.68	8.83	8.94	9.32	0.60	0.75	0.86	1.24	0.60	0.98	1.37	1.88
Dec-94	7.99	8.46	8.62	8.73	9.11	0.47	0.63	0.74	1.12	0.60	0.97	1.37	1.88
Jan-95	7.80	8.46	8.60	8.70	9.08	0.66	0.80	0.90	1.28	0.60	0.97	1.36	1.88
Feb-95	7.58	8.26	8.39	8.48	8.85	0.68	0.81	0.90	1.27	0.60	0.97	1.36	1.87
Mar-95	7.55	8.12	8.24	8.33	8.70	0.57	0.69	0.78	1.15	0.60	0.97	1.36	1.87
Apr-95	7.45	8.03	8.12	8.23	8.60	0.58	0.67	0.78	1.15	0.60	0.97	1.35	1.86
May-95	6.77	7.65	7.74	7.86	8.20	0.88	0.97	1.09	1.43	0.60	0.97	1.35	1.86
Jun-95	6.70	7.30	7.43	7.53	7.90	0.60	0.73	0.83	1.20	0.60	0.97	1.35	1.86
Jul-95	6.91	7.41	7.54	7.65	8.04	0.50	0.63	0.74	1.13	0.60	0.97	1.35	1.85
Aug-95	6.74	7.57	7.69	7.79	8.19	0.83	0.95	1.05	1.45	0.61	0.97	1.34	1.85
Sep-95	6.63	7.32	7.45	7.56	7.93	0.69	0.82	0.93	1.30	0.61	0.96	1.34	1.85
Oct-95	6.41	7.12	7.27	7.39	7.75	0.71	0.86	0.98	1.34	0.61	0.96	1.34	1.85
Nov-95	6.23	7.02	7.18	7.32	7.68	0.79	0.95	1.09	1.45	0.61	0.96	1.34	1.84
Dec-95	6.03	6.82	6.99	7.13	7.49	0.79	0.96	1.10	1.46	0.61	0.96	1.34	1.84
Jan-96	6.09	6.81	6.99	7.12	7.47	0.72	0.90	1.03	1.38	0.61	0.96	1.34	1.84
Feb-96	6.59	6.99	7.16	7.31	7.63	0.40	0.57	0.72	1.04	0.61	0.96	1.33	1.84
Mar-96	6.84	7.35	7.52	7.68	8.03	0.51	0.68	0.84	1.19	0.61	0.96	1.33	1.83
Apr-96	7.06	7.50	7.68	7.83	8.19	0.44	0.62	0.77	1.13	0.61	0.96	1.33	1.83
May-96	7.17	7.62	7.77	7.94	8.30	0.45	0.60	0.77	1.13	0.61	0.96	1.33	1.83
Jun-96	7.03	7.71	7.87	8.02	8.40	0.68	0.84	0.99	1.37	0.61	0.96	1.32	1.82
Jul-96	7.07	7.65	7.82	7.97	8.35	0.58	0.75	0.90	1.28	0.61	0.95	1.32	1.82
Aug-96	7.26	7.46	7.63	7.77	8.18	0.20	0.37	0.51	0.92	0.60	0.95	1.32	1.82
Sep-96	7.04	7.66	7.82	7.95	8.35	0.62	0.78	0.91	1.31	0.60	0.95	1.32	1.81
Oct-96	6.71	7.39	7.58	7.70	8.07	0.68	0.87	0.99	1.36	0.60	0.95	1.31	1.81
Nov-96	6.43	7.10	7.31	7.41	7.79	0.67	0.88	0.98	1.36	0.60	0.95	1.31	1.81
Dec-96	6.73	7.20	7.41	7.51	7.89	0.47	0.68	0.78	1.16	0.60	0.95	1.31	1.81
Jan-97	6.89	7.42	7.63	7.71	8.09	0.53	0.74	0.82	1.20	0.60	0.95	1.31	1.80
Feb-97	6.94	7.31	7.54	7.59	7.94	0.37	0.60	0.65	1.00	0.60	0.95	1.30	1.80
Mar-97	7.23	7.55	7.77	7.82	8.18	0.32	0.54	0.59	0.95	0.60	0.94	1.30	1.80
Apr-97	7.05	7.73	7.93	7.98	8.34	0.68	0.88	0.93	1.29	0.60	0.94	1.30	1.79
May-97	7.01	7.58	7.80	7.86	8.20	0.57	0.79	0.85	1.19	0.60	0.94	1.30	1.79
Jun-97	6.88	7.41	7.62	7.68	8.02	0.53	0.74	0.80	1.14	0.60	0.94	1.29	1.79
Jul-97	6.37	7.14	7.36	7.42	7.75	0.77	0.99	1.05	1.38	0.60	0.94	1.29	1.78
Aug-97	6.72	7.22	7.40	7.46	7.82	0.50	0.68	0.74	1.10	0.60	0.94	1.29	1.78
Sep-97	6.49	7.15	7.34	7.39	7.70	0.66	0.85	0.90	1.21	0.60	0.94	1.29	1.78
Oct-97	6.23	7.00	7.20	7.27	7.57	0.77	0.97	1.04	1.34	0.60	0.94	1.29	1.78
Nov-97	6.14	6.87	7.07	7.15	7.42	0.73	0.93	1.01	1.28	0.60	0.94	1.29	1.77

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
Dec-97	6.02	6.76	6.99	7.05	7.32	0.74	0.97	1.03	1.30	0.60	0.94	1.28	1.77
Jan-98	5.89	6.61	6.82	6.93	7.19	0.72	0.93	1.04	1.30	0.60	0.94	1.28	1.77
Feb-98	5.99	6.67	6.88	7.01	7.25	0.68	0.89	1.02	1.26	0.60	0.94	1.28	1.77
Mar-98	6.02	6.72	6.93	7.05	7.32	0.70	0.91	1.03	1.30	0.60	0.94	1.28	1.77
Apr-98	6.04	6.69	6.90	7.03	7.33	0.65	0.86	0.99	1.29	0.60	0.94	1.28	1.76
May-98	5.92	6.69	6.91	7.03	7.30	0.77	0.99	1.11	1.38	0.61	0.94	1.28	1.76
Jun-98	5.76	6.53	6.78	6.88	7.13	0.77	1.02	1.12	1.37	0.61	0.94	1.28	1.76
Jul-98	5.84	6.55	6.78	6.89	7.15	0.71	0.94	1.05	1.31	0.61	0.94	1.28	1.76
Aug-98	5.47	6.52	6.77	6.89	7.14	1.05	1.30	1.42	1.67	0.61	0.94	1.28	1.76
Sep-98	5.17	6.41	6.69	6.82	7.09	1.24	1.52	1.65	1.92	0.61	0.95	1.28	1.76
Oct-98	5.40	6.37	6.69	6.85	7.18	0.97	1.29	1.45	1.78	0.61	0.95	1.28	1.76
Nov-98	5.35	6.41	6.79	6.95	7.34	1.06	1.44	1.60	1.99	0.62	0.95	1.28	1.76
Dec-98	5.42	6.22	6.65	6.80	7.23	0.80	1.23	1.38	1.81	0.62	0.95	1.28	1.76
Jan-99	5.36	6.24	6.68	6.84	7.29	0.88	1.32	1.48	1.93	0.62	0.95	1.28	1.76
Feb-99	5.87	6.40	6.79	6.97	7.39	0.53	0.92	1.10	1.52	0.62	0.95	1.28	1.76
Mar-99	5.92	6.62	6.98	7.14	7.53	0.70	1.06	1.22	1.61	0.62	0.95	1.28	1.76
Apr-99	5.94	6.64	6.96	7.13	7.48	0.70	1.02	1.19	1.54	0.62	0.95	1.28	1.76
May-99	6.15	6.93	7.23	7.40	7.72	0.78	1.08	1.25	1.57	0.62	0.95	1.28	1.76
Jun-99	6.27	7.23	7.52	7.69	8.02	0.96	1.25	1.42	1.75	0.62	0.95	1.28	1.76
Jul-99	6.39	7.19	7.48	7.65	7.95	0.80	1.09	1.26	1.56	0.62	0.95	1.28	1.76
Aug-99	6.49	7.40	7.68	7.84	8.15	0.91	1.19	1.35	1.66	0.62	0.96	1.28	1.76
Sep-99	6.46	7.39	7.68	7.84	8.20	0.93	1.22	1.38	1.74	0.62	0.96	1.28	1.76
Oct-99	6.51	7.55	7.79	7.99	8.38	1.04	1.28	1.48	1.87	0.62	0.96	1.28	1.76
Nov-99	6.62	7.36	7.62	7.79	8.15	0.74	1.00	1.17	1.53	0.63	0.96	1.28	1.76
Dec-99	6.82	7.55	7.78	7.96	8.19	0.73	0.96	1.14	1.37	0.63	0.96	1.28	1.75
Jan-00	6.66	7.78	7.96	8.15	8.33	1.12	1.30	1.49	1.67	0.63	0.96	1.28	1.75
Feb-00	6.46	7.68	7.82	8.06	8.29	1.22	1.36	1.60	1.83	0.63	0.96	1.28	1.75
Mar-00	6.18	7.68	7.83	8.07	8.37	1.50	1.65	1.89	2.19	0.63	0.96	1.29	1.76
Apr-00	6.30	7.64	7.82	8.07	8.40	1.34	1.52	1.77	2.10	0.64	0.97	1.29	1.76
May-00	6.40	7.99	8.24	8.49	8.90	1.59	1.84	2.09	2.50	0.64	0.97	1.29	1.76
Jun-00	6.22	7.67	7.87	8.18	8.48	1.45	1.65	1.96	2.26	0.64	0.97	1.30	1.76
Jul-00	6.11	7.65	7.81	8.11	8.35	1.54	1.70	2.00	2.24	0.65	0.98	1.30	1.76
Aug-00	5.94	7.55	7.70	8.02	8.26	1.61	1.76	2.08	2.32	0.65	0.98	1.30	1.77
Sep-00	6.12	7.62	7.83	8.13	8.35	1.50	1.71	2.01	2.23	0.65	0.98	1.30	1.77
Oct-00	6.00	7.55	7.81	8.11	8.34	1.55	1.81	2.11	2.34	0.66	0.99	1.31	1.77
Nov-00	5.76	7.45	7.75	8.09	8.28	1.69	1.99	2.33	2.52	0.66	0.99	1.31	1.77
Dec-00	5.58	7.21	7.48	7.88	8.02	1.63	1.90	2.30	2.44	0.67	0.99	1.32	1.78
Jan-01	5.62	7.15	7.38	7.75	7.93	1.53	1.76	2.13	2.31	0.67	1.00	1.32	1.78
Feb-01	5.49	7.10	7.32	7.69	7.87	1.61	1.83	2.20	2.38	0.67	1.00	1.32	1.78
Mar-01	5.59	6.98	7.22	7.61	7.84	1.39	1.63	2.02	2.25	0.68	1.00	1.32	1.78
Apr-01	5.93	7.20	7.43	7.82	8.07	1.27	1.50	1.89	2.14	0.68	1.00	1.33	1.78
May-01	5.94	7.29	7.50	7.88	8.07	1.35	1.56	1.94	2.13	0.68	1.01	1.33	1.78
Jun-01	5.90	7.18	7.34	7.73	7.97	1.28	1.44	1.83	2.07	0.68	1.01	1.33	1.79

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
Jul-01	5.61	7.13	7.27	7.65	7.97	1.52	1.66	2.04	2.36	0.69	1.01	1.33	1.79
Aug-01	5.46	7.02	7.11	7.48	7.85	1.56	1.65	2.02	2.39	0.69	1.01	1.34	1.79
Sep-01	5.42	7.17	7.27	7.67	8.03	1.75	1.85	2.25	2.61	0.69	1.02	1.34	1.79
Oct-01	5.06	7.03	7.13	7.59	7.91	1.97	2.07	2.53	2.85	0.70	1.02	1.34	1.80
Nov-01	5.53	6.97	7.01	7.49	7.81	1.44	1.48	1.96	2.28	0.70	1.02	1.35	1.80
Dec-01	5.75	6.76	7.19	7.70	8.05	1.01	1.44	1.95	2.30	0.70	1.02	1.35	1.80
Jan-02	5.69	6.55	7.03	7.50	7.87	0.86	1.34	1.81	2.18	0.70	1.02	1.35	1.80
Feb-02	5.63	6.51	6.95	7.37	7.89	0.88	1.32	1.74	2.26	0.70	1.03	1.35	1.80
Mar-02	6.04	6.81	7.22	7.62	8.11	0.77	1.18	1.58	2.07	0.70	1.03	1.35	1.81
Apr-02	5.75	6.76	7.16	7.49	8.04	1.01	1.41	1.74	2.29	0.71	1.03	1.35	1.81
May-02	5.78	6.75	7.20	7.43	8.09	0.97	1.42	1.65	2.31	0.71	1.03	1.36	1.81
Jun-02	5.66	6.64	7.08	7.25	7.96	0.98	1.42	1.59	2.30	0.71	1.03	1.36	1.81
Jul-02	5.44	6.53	6.98	7.14	7.90	1.09	1.54	1.70	2.46	0.71	1.03	1.36	1.81
Aug-02	5.10	6.37	6.84	6.95	7.58	1.27	1.74	1.85	2.48	0.71	1.03	1.36	1.82
Sep-02	4.80	6.15	6.63	6.76	7.40	1.35	1.83	1.96	2.60	0.71	1.04	1.36	1.82
Oct-02	5.08	6.33	6.74	6.95	7.74	1.25	1.66	1.87	2.66	0.72	1.04	1.36	1.82
Nov-02	5.21	6.31	6.71	6.89	7.62	1.10	1.50	1.68	2.41	0.72	1.04	1.36	1.82
Dec-02	4.84	6.21	6.63	6.80	7.45	1.37	1.79	1.96	2.61	0.72	1.04	1.37	1.83
Jan-03	4.95	6.17	6.59	6.76	7.35	1.22	1.64	1.81	2.40	0.72	1.05	1.37	1.83
Feb-03	4.72	5.95	6.34	6.63	7.06	1.23	1.62	1.91	2.34	0.72	1.05	1.37	1.83
Mar-03	4.86	5.89	6.28	6.54	6.95	1.03	1.42	1.68	2.09	0.72	1.05	1.37	1.83
Apr-03	4.81	5.74	6.22	6.45	6.85	0.93	1.41	1.64	2.04	0.72	1.05	1.37	1.83
May-03	4.36	5.22	5.85	6.08	6.38	0.86	1.49	1.72	2.02	0.73	1.05	1.37	1.83
Jun-03	4.52	4.97	5.72	5.92	6.19	0.45	1.20	1.40	1.67	0.72	1.05	1.37	1.83
Jul-03	5.42	5.49	6.07	6.34	6.62	0.07	0.65	0.92	1.20	0.72	1.05	1.37	1.83
Aug-03	5.32	5.87	6.31	6.63	7.01	0.55	0.99	1.31	1.69	0.72	1.05	1.37	1.83
Sep-03	4.90	5.72	6.13	6.42	6.79	0.82	1.23	1.52	1.89	0.72	1.05	1.37	1.83
Oct-03	5.18	5.70	6.11	6.33	6.73	0.52	0.93	1.15	1.55	0.72	1.05	1.37	1.83
Nov-03	5.19	5.65	6.08	6.28	6.66	0.46	0.89	1.09	1.47	0.72	1.05	1.37	1.83
Dec-03	5.11	5.65	6.02	6.19	6.60	0.54	0.91	1.08	1.49	0.72	1.05	1.37	1.83
Jan-04	4.99	5.54	5.91	6.08	6.44	0.55	0.92	1.09	1.45	0.72	1.05	1.37	1.83
Feb-04	4.83	5.50	5.87	6.04	6.27	0.67	1.04	1.21	1.44	0.72	1.05	1.37	1.82
Mar-04	4.74	5.33	5.70	5.86	6.11	0.59	0.96	1.12	1.37	0.72	1.05	1.37	1.82
Apr-04	5.31	5.73	6.10	6.25	6.46	0.42	0.79	0.94	1.15	0.72	1.05	1.37	1.82
May-04	5.39	6.04	6.40	6.54	6.75	0.65	1.01	1.15	1.36	0.72	1.05	1.37	1.82
Jun-04	5.32	6.01	6.21	6.42	6.78	0.69	0.89	1.10	1.46	0.72	1.05	1.36	1.82
Jul-04	5.23	5.82	6.02	6.23	6.62	0.59	0.79	1.00	1.39	0.72	1.05	1.36	1.82
Aug-04	4.93	5.65	5.87	6.08	6.48	0.72	0.94	1.15	1.55	0.72	1.05	1.36	1.81
Sep-04	4.88	5.46	5.73	5.91	6.27	0.58	0.85	1.03	1.39	0.72	1.05	1.36	1.81
Oct-04	4.78	5.47	5.69	5.86	6.21	0.69	0.91	1.08	1.43	0.72	1.05	1.36	1.81
Nov-04	5.02	5.52	5.72	5.88	6.21	0.50	0.70	0.86	1.19	0.72	1.04	1.36	1.81

Table No. MJV-12

Panel B: Spread Between Moody's Corporate Yields and US Long-Term Government Yields (%)

Month	US LT Gov't Bond Yield [1]	Moody's Aaa Corporate Bond Yield [2]	Moody's Aa Corporate Bond Yield [3]	Moody's A Corporate Bond Yield [4]	Moody's Baa Corporate Bond Yield [5]	Spread (Corporate Aaa - LT Gov't) [6]	Spread (Corporate Aa - LT Gov't) [7]	Spread (Corporate A - LT Gov't) [8]	Spread (Corporate Baa - LT Gov't) [9]	Cumulative Mean (Corporate Aaa - LT Gov't Spread) [10]	Cumulative Mean (Corporate Aa - LT Gov't Spread) [11]	Cumulative Mean (Corporate A - LT Gov't Spread) [12]	Cumulative Mean (Corporate Baa - LT Gov't Spread) [13]
Dec-04	4.84	5.47	5.69	5.82	6.15	0.63	0.85	0.98	1.31	0.71	1.04	1.36	1.81
Jan-05	4.65	5.36	5.58	5.68	6.02	0.71	0.93	1.03	1.37	0.71	1.04	1.36	1.81
Feb-05	4.79	5.20	5.44	5.51	5.82	0.41	0.65	0.72	1.03	0.71	1.04	1.35	1.80
Average Spread -- January 1980 to February 2005						**0.71**	**1.04**	**1.35**	**1.80**	**0.65**	**1.07**	**1.51**	**2.07**
Average Spread -- January 1990 to August 1998						**0.57**	**0.78**	**0.94**	**1.33**	**0.61**	**0.99**	**1.40**	**1.92**
Average Spread -- January 1990 to December 2000						**0.69**	**0.91**	**1.08**	**1.45**	**0.62**	**0.99**	**1.38**	**1.89**
Average Spread -- January 1990 to February 2005						**0.76**	**1.02**	**1.21**	**1.59**	**0.64**	**1.00**	**1.37**	**1.87**
Average Spread -- December 2000 to December 2001						**1.49**	**1.67**	**2.08**	**2.35**	**0.68**	**1.01**	**1.33**	**1.79**
Average Spread -- December 2000 to December 2002						**1.29**	**1.60**	**1.93**	**2.37**	**0.70**	**1.02**	**1.34**	**1.80**
Average Spread -- December 2000 to February 2005						**0.97**	**1.30**	**1.57**	**1.96**	**0.71**	**1.03**	**1.36**	**1.81**
Average Spread -- January 2001 to December 2001						**1.47**	**1.66**	**2.06**	**2.34**	**0.69**	**1.01**	**1.33**	**1.79**
Average Spread -- January 2002 to December 2002						**1.08**	**1.51**	**1.76**	**2.39**	**0.71**	**1.03**	**1.36**	**1.81**
Average Spread -- January 2003 to February 2005						**0.66**	**1.02**	**1.22**	**1.57**	**0.72**	**1.05**	**1.37**	**1.82**

Sources and Notes:
[1]: Ibbotson Long-Term Government bond yields from the Ibbotson Associates Yearbook.
[2] - [5]: Mergent Bond Record.
[6]: [2] - [1].
[7]: [3] - [1].
[8]: [4] - [1].
[9]: [5] - [1].
[10]: Cumulative average of column [6].
[11]: Cumulative average of column [7].
[12]: Cumulative average of column [8].
[13]: Cumulative average of column [9].

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return [1]	US LT Gov't Bond Yield [2]	Moodys A Utility Bond Yield [3]	Moodys Baa Utility Bond Yield [4]	Spread (Gov't.- 30 day T-bill) [5]	Spread (A Util- 30 day T-bill) [6]	Spread (Baa Util- 30 day T-bill) [7]
01/31/1980	0.100	0.111	0.123	0.129	0.012	0.023	0.029
02/29/1980	0.112	0.119	0.136	0.144	0.007	0.024	0.033
03/31/1980	0.155	0.124	0.147	0.153	-0.031	-0.008	-0.002
04/30/1980	0.162	0.108	0.139	0.144	-0.054	-0.023	-0.018
05/31/1980	0.102	0.104	0.125	0.129	0.002	0.024	0.028
06/30/1980	0.076	0.101	0.122	0.126	0.025	0.046	0.050
07/31/1980	0.065	0.107	0.123	0.128	0.042	0.057	0.062
08/31/1980	0.079	0.114	0.130	0.135	0.035	0.050	0.056
09/30/1980	0.094	0.118	0.134	0.141	0.024	0.040	0.046
10/31/1980	0.120	0.123	0.136	0.144	0.003	0.016	0.024
11/30/1980	0.121	0.123	0.141	0.148	0.002	0.020	0.027
12/31/1980	0.169	0.120	0.146	0.153	-0.049	-0.022	-0.016
01/31/1981	0.132	0.121	0.143	0.153	-0.011	0.011	0.021
02/28/1981	0.136	0.128	0.149	0.159	-0.008	0.013	0.022
03/31/1981	0.155	0.125	0.151	0.158	-0.030	-0.004	0.003
04/30/1981	0.137	0.133	0.155	0.161	-0.004	0.018	0.024
05/31/1981	0.148	0.126	0.163	0.167	-0.021	0.015	0.019
06/30/1981	0.174	0.130	0.157	0.163	-0.044	-0.017	-0.011
07/31/1981	0.159	0.137	0.162	0.170	-0.022	0.003	0.010
08/31/1981	0.165	0.144	0.166	0.172	-0.020	0.001	0.007
09/30/1981	0.160	0.148	0.172	0.178	-0.012	0.012	0.018
10/31/1981	0.155	0.138	0.172	0.177	-0.016	0.017	0.022
11/30/1981	0.136	0.122	0.162	0.165	-0.014	0.026	0.029
12/31/1981	0.110	0.133	0.163	0.170	0.023	0.053	0.060
01/31/1982	0.100	0.142	0.168	0.178	0.042	0.069	0.079
02/28/1982	0.117	0.140	0.168	0.178	0.024	0.052	0.062
03/31/1982	0.124	0.139	0.165	0.172	0.014	0.041	0.047
04/30/1982	0.144	0.135	0.163	0.170	-0.009	0.019	0.026
05/31/1982	0.135	0.136	0.160	0.167	0.001	0.026	0.032
06/30/1982	0.121	0.141	0.164	0.172	0.020	0.043	0.051
07/31/1982	0.134	0.135	0.164	0.171	0.002	0.031	0.037

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return [1]	US LT Gov't Bond Yield [2]	Moodys A Utility Bond Yield [3]	Moodys Baa Utility Bond Yield [4]	Spread (Gov't.- 30 day T-bill) [5]	Spread (A Util- 30 day T-bill) [6]	Spread (Baa Util- 30 day T-bill) [7]
08/31/1982	0.095	0.125	0.158	0.164	0.030	0.063	0.068
09/30/1982	0.063	0.118	0.154	0.157	0.055	0.091	0.094
10/31/1982	0.073	0.111	0.148	0.151	0.038	0.075	0.078
11/30/1982	0.079	0.112	0.145	0.148	0.034	0.066	0.069
12/31/1982	0.084	0.110	0.144	0.147	0.026	0.060	0.063
01/31/1983	0.086	0.111	0.142	0.146	0.026	0.057	0.060
02/28/1983	0.077	0.106	0.143	0.146	0.029	0.066	0.069
03/31/1983	0.079	0.108	0.139	0.143	0.030	0.061	0.065
04/30/1983	0.089	0.105	0.136	0.141	0.016	0.047	0.052
05/31/1983	0.086	0.111	0.135	0.141	0.025	0.049	0.054
06/30/1983	0.083	0.112	0.136	0.142	0.029	0.053	0.059
07/31/1983	0.093	0.120	0.136	0.140	0.027	0.043	0.048
08/31/1983	0.095	0.121	0.136	0.142	0.026	0.040	0.047
09/30/1983	0.095	0.116	0.134	0.141	0.021	0.039	0.046
10/31/1983	0.095	0.119	0.133	0.140	0.024	0.037	0.044
11/30/1983	0.088	0.118	0.134	0.141	0.030	0.046	0.053
12/31/1983	0.091	0.120	0.135	0.142	0.029	0.044	0.051
01/31/1984	0.095	0.118	0.134	0.141	0.023	0.039	0.046
02/29/1984	0.089	0.122	0.134	0.141	0.033	0.045	0.051
03/31/1984	0.091	0.125	0.139	0.146	0.034	0.048	0.055
04/30/1984	0.102	0.128	0.142	0.148	0.026	0.039	0.046
05/31/1984	0.098	0.138	0.149	0.153	0.040	0.051	0.055
06/30/1984	0.094	0.137	0.151	0.155	0.043	0.057	0.061
07/31/1984	0.103	0.129	0.148	0.155	0.027	0.045	0.052
08/31/1984	0.104	0.127	0.144	0.148	0.023	0.040	0.044
09/30/1984	0.108	0.124	0.142	0.145	0.015	0.034	0.037
10/31/1984	0.126	0.117	0.138	0.142	-0.009	0.012	0.015
11/30/1984	0.092	0.117	0.132	0.137	0.025	0.041	0.046
12/31/1984	0.080	0.117	0.131	0.135	0.037	0.051	0.055
01/31/1985	0.081	0.113	0.130	0.134	0.032	0.049	0.053
02/28/1985	0.072	0.121	0.131	0.134	0.049	0.059	0.063

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return [1]	US LT Gov't Bond Yield [2]	Moodys A Utility Bond Yield [3]	Moodys Baa Utility Bond Yield [4]	Spread (Gov't.- 30 day T-bill) [5]	Spread (A Util- 30 day T-bill) [6]	Spread (Baa Util- 30 day T-bill) [7]
03/31/1985	0.076	0.118	0.139	0.142	0.042	0.062	0.065
04/30/1985	0.089	0.116	0.136	0.141	0.027	0.047	0.052
05/31/1985	0.083	0.106	0.131	0.136	0.024	0.049	0.054
06/30/1985	0.069	0.105	0.121	0.127	0.037	0.053	0.058
07/31/1985	0.078	0.109	0.121	0.127	0.031	0.043	0.049
08/31/1985	0.068	0.107	0.121	0.127	0.039	0.053	0.059
09/30/1985	0.075	0.108	0.121	0.127	0.033	0.046	0.052
10/31/1985	0.081	0.105	0.120	0.125	0.024	0.039	0.045
11/30/1985	0.075	0.101	0.115	0.120	0.026	0.039	0.045
12/31/1985	0.081	0.096	0.110	0.115	0.015	0.029	0.034
01/31/1986	0.069	0.096	0.108	0.112	0.027	0.039	0.043
02/28/1986	0.065	0.084	0.103	0.107	0.019	0.037	0.042
03/31/1986	0.074	0.077	0.095	0.099	0.003	0.021	0.025
04/30/1986	0.064	0.078	0.091	0.096	0.014	0.027	0.032
05/31/1986	0.061	0.085	0.096	0.100	0.024	0.035	0.039
06/30/1986	0.065	0.079	0.096	0.100	0.014	0.031	0.035
07/31/1986	0.064	0.081	0.094	0.097	0.017	0.029	0.033
08/31/1986	0.057	0.076	0.093	0.097	0.020	0.036	0.040
09/30/1986	0.055	0.083	0.095	0.100	0.027	0.040	0.044
10/31/1986	0.057	0.080	0.095	0.100	0.023	0.038	0.042
11/30/1986	0.048	0.078	0.093	0.097	0.030	0.045	0.049
12/31/1986	0.060	0.079	0.091	0.095	0.019	0.031	0.035
01/31/1987	0.051	0.078	0.090	0.093	0.027	0.039	0.042
02/28/1987	0.053	0.076	0.090	0.092	0.023	0.037	0.039
03/31/1987	0.058	0.080	0.089	0.092	0.022	0.031	0.034
04/30/1987	0.055	0.086	0.094	0.099	0.031	0.039	0.044
05/31/1987	0.046	0.088	0.099	0.104	0.042	0.053	0.058
06/30/1987	0.059	0.088	0.100	0.105	0.028	0.041	0.045
07/31/1987	0.056	0.091	0.102	0.106	0.034	0.045	0.050
08/31/1987	0.058	0.094	0.105	0.109	0.036	0.046	0.051
09/30/1987	0.056	0.099	0.112	0.116	0.044	0.057	0.060

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return	US LT Gov't Bond Yield	Moodys A Utility Bond Yield	Moodys Baa Utility Bond Yield	Spread (Gov't.- 30 day T-bill)	Spread (A Util- 30 day T-bill)	Spread (Baa Util- 30 day T-bill)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
10/31/1987	0.074	0.093	0.113	0.119	0.019	0.039	0.045
11/30/1987	0.042	0.093	0.108	0.114	0.051	0.066	0.072
12/31/1987	0.048	0.092	0.110	0.116	0.044	0.062	0.068
01/31/1988	0.036	0.085	0.108	0.113	0.049	0.072	0.078
02/29/1988	0.056	0.085	0.101	0.107	0.029	0.045	0.050
03/31/1988	0.054	0.090	0.101	0.107	0.036	0.047	0.053
04/30/1988	0.057	0.093	0.105	0.112	0.036	0.049	0.055
05/31/1988	0.062	0.095	0.108	0.114	0.033	0.046	0.051
06/30/1988	0.060	0.092	0.108	0.113	0.032	0.048	0.053
07/31/1988	0.063	0.095	0.110	0.115	0.032	0.048	0.053
08/31/1988	0.074	0.095	0.112	0.117	0.021	0.038	0.043
09/30/1988	0.077	0.092	0.106	0.111	0.015	0.030	0.035
10/31/1988	0.076	0.089	0.100	0.103	0.013	0.024	0.027
11/30/1988	0.070	0.092	0.099	0.104	0.022	0.029	0.033
12/31/1988	0.079	0.092	0.101	0.104	0.013	0.022	0.026
01/31/1989	0.068	0.090	0.101	0.104	0.022	0.033	0.036
02/28/1989	0.076	0.093	0.101	0.104	0.017	0.025	0.028
03/31/1989	0.084	0.093	0.102	0.105	0.009	0.019	0.021
04/30/1989	0.084	0.092	0.102	0.105	0.008	0.018	0.021
05/31/1989	0.099	0.088	0.100	0.103	-0.011	0.001	0.004
06/30/1989	0.089	0.082	0.096	0.098	-0.006	0.008	0.009
07/31/1989	0.087	0.080	0.095	0.096	-0.007	0.008	0.010
08/31/1989	0.092	0.084	0.095	0.096	-0.008	0.003	0.004
09/30/1989	0.081	0.085	0.096	0.097	0.003	0.014	0.016
10/31/1989	0.084	0.081	0.095	0.096	-0.003	0.011	0.012
11/30/1989	0.086	0.081	0.095	0.096	-0.005	0.010	0.011
12/31/1989	0.075	0.082	0.094	0.096	0.006	0.019	0.021
01/31/1990	0.070	0.086	0.096	0.097	0.016	0.025	0.027
02/28/1990	0.070	0.088	0.098	0.100	0.017	0.027	0.029
03/31/1990	0.080	0.089	0.099	0.101	0.009	0.018	0.021
04/30/1990	0.086	0.092	0.099	0.101	0.007	0.014	0.016

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return [1]	US LT Gov't Bond Yield [2]	Moodys A Utility Bond Yield [3]	Moodys Baa Utility Bond Yield [4]	Spread (Gov't.- 30 day T-bill) [5]	Spread (A Util- 30 day T-bill) [6]	Spread (Baa Util- 30 day T-bill) [7]
05/31/1990	0.084	0.088	0.100	0.102	0.004	0.016	0.017
06/30/1990	0.078	0.086	0.098	0.100	0.009	0.020	0.022
07/31/1990	0.084	0.086	0.098	0.099	0.002	0.013	0.015
08/31/1990	0.082	0.092	0.099	0.101	0.010	0.017	0.019
09/30/1990	0.074	0.091	0.101	0.103	0.017	0.027	0.029
10/31/1990	0.085	0.090	0.101	0.103	0.005	0.016	0.018
11/30/1990	0.070	0.086	0.099	0.101	0.016	0.029	0.031
12/31/1990	0.074	0.084	0.097	0.100	0.010	0.023	0.025
01/31/1991	0.064	0.084	0.097	0.100	0.020	0.033	0.036
02/28/1991	0.059	0.084	0.095	0.097	0.025	0.036	0.038
03/31/1991	0.054	0.084	0.096	0.097	0.030	0.042	0.043
04/30/1991	0.066	0.084	0.095	0.096	0.018	0.029	0.030
05/31/1991	0.058	0.085	0.094	0.096	0.026	0.036	0.038
06/30/1991	0.051	0.086	0.096	0.098	0.035	0.045	0.047
07/31/1991	0.060	0.085	0.096	0.097	0.025	0.035	0.037
08/31/1991	0.057	0.082	0.093	0.095	0.025	0.036	0.038
09/30/1991	0.056	0.079	0.092	0.093	0.023	0.036	0.037
10/31/1991	0.052	0.079	0.091	0.093	0.027	0.039	0.041
11/30/1991	0.048	0.079	0.091	0.093	0.031	0.042	0.045
12/31/1991	0.046	0.073	0.089	0.091	0.027	0.042	0.044
01/31/1992	0.041	0.078	0.088	0.090	0.036	0.047	0.048
02/29/1992	0.034	0.078	0.089	0.091	0.043	0.055	0.056
03/31/1992	0.041	0.080	0.090	0.092	0.038	0.048	0.050
04/30/1992	0.039	0.080	0.089	0.091	0.041	0.050	0.052
05/31/1992	0.034	0.078	0.089	0.090	0.044	0.055	0.056
06/30/1992	0.039	0.077	0.088	0.089	0.037	0.049	0.050
07/31/1992	0.038	0.073	0.086	0.087	0.035	0.048	0.049
08/31/1992	0.032	0.073	0.084	0.086	0.041	0.053	0.054
09/30/1992	0.032	0.071	0.084	0.085	0.039	0.052	0.054
10/31/1992	0.028	0.074	0.085	0.088	0.046	0.057	0.060
11/30/1992	0.028	0.075	0.086	0.089	0.047	0.058	0.061

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return [1]	US LT Gov't Bond Yield [2]	Moodys A Utility Bond Yield [3]	Moodys Baa Utility Bond Yield [4]	Spread (Gov't.- 30 day T-bill) [5]	Spread (A Util- 30 day T-bill) [6]	Spread (Baa Util- 30 day T-bill) [7]
12/31/1992	0.034	0.073	0.084	0.087	0.038	0.050	0.053
01/31/1993	0.028	0.073	0.083	0.086	0.045	0.055	0.058
02/28/1993	0.027	0.070	0.080	0.083	0.043	0.054	0.056
03/31/1993	0.030	0.070	0.079	0.081	0.040	0.049	0.051
04/30/1993	0.029	0.070	0.078	0.081	0.041	0.049	0.052
05/31/1993	0.027	0.070	0.079	0.082	0.043	0.052	0.055
06/30/1993	0.030	0.067	0.078	0.081	0.036	0.047	0.050
07/31/1993	0.029	0.066	0.075	0.079	0.036	0.046	0.050
08/31/1993	0.030	0.062	0.073	0.076	0.032	0.042	0.045
09/30/1993	0.032	0.063	0.070	0.074	0.031	0.039	0.042
10/31/1993	0.027	0.062	0.070	0.073	0.036	0.044	0.046
11/30/1993	0.030	0.065	0.073	0.077	0.035	0.043	0.046
12/31/1993	0.028	0.065	0.073	0.077	0.037	0.045	0.049
01/31/1994	0.030	0.064	0.073	0.077	0.033	0.043	0.046
02/28/1994	0.025	0.068	0.075	0.078	0.043	0.049	0.052
03/31/1994	0.033	0.073	0.079	0.081	0.040	0.046	0.048
04/30/1994	0.033	0.075	0.082	0.085	0.042	0.049	0.052
05/31/1994	0.039	0.076	0.083	0.086	0.037	0.044	0.047
06/30/1994	0.038	0.077	0.083	0.086	0.040	0.045	0.049
07/31/1994	0.034	0.075	0.085	0.088	0.040	0.051	0.054
08/31/1994	0.045	0.076	0.084	0.087	0.031	0.039	0.042
09/30/1994	0.045	0.080	0.086	0.090	0.035	0.041	0.044
10/31/1994	0.047	0.081	0.089	0.092	0.034	0.042	0.046
11/30/1994	0.045	0.081	0.090	0.094	0.035	0.044	0.048
12/31/1994	0.054	0.080	0.088	0.092	0.026	0.034	0.038
01/31/1995	0.052	0.078	0.087	0.092	0.026	0.036	0.040
02/28/1995	0.049	0.076	0.085	0.089	0.027	0.036	0.040
03/31/1995	0.057	0.076	0.084	0.088	0.019	0.027	0.031
04/30/1995	0.054	0.075	0.083	0.087	0.020	0.029	0.033
05/31/1995	0.067	0.068	0.079	0.083	0.001	0.012	0.016
06/30/1995	0.058	0.067	0.076	0.080	0.009	0.018	0.022

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return	US LT Gov't Bond Yield	Moodys A Utility Bond Yield	Moodys Baa Utility Bond Yield	Spread (Gov't.- 30 day T-bill)	Spread (A Util- 30 day T-bill)	Spread (Baa Util- 30 day T-bill)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
07/31/1995	0.055	0.069	0.077	0.081	0.014	0.022	0.026
08/31/1995	0.058	0.067	0.078	0.082	0.010	0.020	0.025
09/30/1995	0.053	0.066	0.076	0.080	0.013	0.023	0.027
10/31/1995	0.058	0.064	0.075	0.078	0.006	0.017	0.020
11/30/1995	0.052	0.062	0.074	0.078	0.011	0.023	0.027
12/31/1995	0.060	0.060	0.072	0.076	0.000	0.012	0.016
01/31/1996	0.053	0.061	0.072	0.076	0.008	0.019	0.024
02/29/1996	0.048	0.066	0.074	0.078	0.018	0.026	0.030
03/31/1996	0.048	0.068	0.077	0.082	0.021	0.029	0.034
04/30/1996	0.057	0.071	0.079	0.083	0.014	0.022	0.027
05/31/1996	0.052	0.072	0.080	0.085	0.020	0.028	0.033
06/30/1996	0.049	0.070	0.081	0.085	0.021	0.032	0.036
07/31/1996	0.055	0.071	0.080	0.084	0.015	0.025	0.029
08/31/1996	0.050	0.073	0.078	0.083	0.022	0.028	0.032
09/30/1996	0.054	0.070	0.080	0.084	0.016	0.026	0.030
10/31/1996	0.052	0.067	0.078	0.082	0.016	0.026	0.030
11/30/1996	0.050	0.064	0.075	0.079	0.014	0.025	0.028
12/31/1996	0.057	0.067	0.076	0.080	0.011	0.019	0.023
01/31/1997	0.055	0.069	0.078	0.082	0.014	0.022	0.026
02/28/1997	0.048	0.069	0.076	0.080	0.022	0.029	0.032
03/31/1997	0.053	0.072	0.079	0.083	0.019	0.026	0.030
04/30/1997	0.053	0.071	0.080	0.084	0.018	0.027	0.031
05/31/1997	0.060	0.070	0.079	0.083	0.010	0.018	0.022
06/30/1997	0.045	0.069	0.077	0.081	0.023	0.032	0.036
07/31/1997	0.053	0.064	0.075	0.079	0.011	0.022	0.026
08/31/1997	0.050	0.067	0.075	0.079	0.017	0.025	0.029
09/30/1997	0.054	0.065	0.075	0.078	0.011	0.021	0.024
10/31/1997	0.052	0.062	0.074	0.077	0.011	0.022	0.025
11/30/1997	0.048	0.061	0.073	0.075	0.014	0.025	0.027
12/31/1997	0.059	0.060	0.072	0.074	0.001	0.012	0.015
01/31/1998	0.053	0.059	0.070	0.073	0.006	0.018	0.020

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return	US LT Gov't Bond Yield	Moodys A Utility Bond Yield	Moodys Baa Utility Bond Yield	Spread (Gov't.- 30 day T-bill)	Spread (A Util- 30 day T-bill)	Spread (Baa Util- 30 day T-bill)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
02/28/1998	0.048	0.060	0.071	0.074	0.012	0.023	0.026
03/31/1998	0.048	0.060	0.072	0.074	0.012	0.024	0.026
04/30/1998	0.053	0.060	0.072	0.074	0.008	0.019	0.021
05/31/1998	0.049	0.059	0.072	0.073	0.010	0.023	0.024
06/30/1998	0.050	0.058	0.070	0.072	0.007	0.020	0.022
07/31/1998	0.049	0.058	0.070	0.072	0.009	0.021	0.023
08/31/1998	0.053	0.055	0.070	0.072	0.002	0.017	0.019
09/30/1998	0.057	0.052	0.069	0.071	-0.005	0.013	0.015
10/31/1998	0.039	0.054	0.070	0.071	0.015	0.031	0.032
11/30/1998	0.038	0.054	0.070	0.073	0.016	0.032	0.035
12/31/1998	0.047	0.054	0.069	0.072	0.008	0.023	0.026
01/31/1999	0.043	0.054	0.070	0.073	0.011	0.027	0.030
02/28/1999	0.043	0.059	0.071	0.074	0.016	0.028	0.031
03/31/1999	0.053	0.059	0.073	0.076	0.006	0.020	0.023
04/30/1999	0.045	0.059	0.072	0.075	0.014	0.027	0.030
05/31/1999	0.042	0.062	0.075	0.077	0.020	0.033	0.036
06/30/1999	0.049	0.063	0.077	0.080	0.014	0.028	0.031
07/31/1999	0.047	0.064	0.077	0.080	0.017	0.031	0.033
08/31/1999	0.048	0.065	0.079	0.082	0.017	0.031	0.034
09/30/1999	0.048	0.065	0.079	0.082	0.017	0.031	0.034
10/31/1999	0.048	0.065	0.081	0.083	0.017	0.033	0.035
11/30/1999	0.044	0.066	0.079	0.081	0.022	0.035	0.037
12/31/1999	0.054	0.068	0.081	0.083	0.014	0.027	0.029

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return [1]	US LT Gov't Bond Yield [2]	Moodys A Utility Bond Yield [3]	Moodys Baa Utility Bond Yield [4]	Spread (Gov't.- 30 day T-bill) [5]	Spread (A Util- 30 day T-bill) [6]	Spread (Baa Util- 30 day T-bill) [7]
01/31/2000	0.050	0.067	0.084	0.084	0.016	0.033	0.034
02/29/2000	0.053	0.065	0.083	0.083	0.012	0.030	0.030
03/31/2000	0.058	0.062	0.083	0.084	0.004	0.025	0.026
04/30/2000	0.057	0.063	0.083	0.084	0.006	0.026	0.027
05/31/2000	0.062	0.064	0.087	0.089	0.002	0.025	0.027
06/30/2000	0.049	0.062	0.084	0.085	0.013	0.035	0.036
07/31/2000	0.059	0.061	0.083	0.083	0.002	0.023	0.024
08/31/2000	0.062	0.059	0.081	0.083	-0.002	0.020	0.021
09/30/2000	0.063	0.061	0.082	0.083	-0.002	0.019	0.020
10/31/2000	0.069	0.060	0.081	0.083	-0.009	0.012	0.014
11/30/2000	0.063	0.058	0.081	0.083	-0.005	0.018	0.020
12/31/2000	0.062	0.056	0.078	0.080	-0.006	0.017	0.018
01/31/2001	0.067	0.056	0.078	0.080	-0.011	0.011	0.013
02/28/2001	0.047	0.055	0.077	0.079	0.008	0.031	0.033
03/31/2001	0.052	0.056	0.077	0.079	0.004	0.025	0.027
04/30/2001	0.048	0.059	0.079	0.081	0.011	0.032	0.033
05/31/2001	0.039	0.059	0.080	0.081	0.020	0.041	0.042
06/30/2001	0.034	0.059	0.079	0.080	0.025	0.044	0.046
07/31/2001	0.037	0.056	0.078	0.081	0.020	0.041	0.044
08/31/2001	0.038	0.055	0.076	0.080	0.017	0.038	0.042
09/30/2001	0.034	0.054	0.078	0.081	0.020	0.043	0.047
10/31/2001	0.027	0.051	0.076	0.080	0.024	0.050	0.053
11/30/2001	0.021	0.055	0.076	0.080	0.035	0.055	0.059
12/31/2001	0.018	0.058	0.078	0.083	0.039	0.060	0.065
01/31/2002	0.017	0.057	0.077	0.081	0.040	0.060	0.064
02/28/2002	0.016	0.056	0.075	0.082	0.041	0.060	0.066

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return [1]	US LT Gov't Bond Yield [2]	Moodys A Utility Bond Yield [3]	Moodys Baa Utility Bond Yield [4]	Spread (Gov't.- 30 day T-bill) [5]	Spread (A Util- 30 day T-bill) [6]	Spread (Baa Util- 30 day T-bill) [7]
03/31/2002	0.016	0.060	0.078	0.083	0.045	0.062	0.067
04/30/2002	0.018	0.058	0.076	0.083	0.039	0.058	0.064
05/31/2002	0.017	0.058	0.075	0.083	0.041	0.058	0.066
06/30/2002	0.016	0.057	0.074	0.083	0.041	0.058	0.067
07/31/2002	0.018	0.054	0.073	0.081	0.036	0.055	0.063
08/31/2002	0.017	0.051	0.072	0.077	0.034	0.055	0.060
09/30/2002	0.017	0.048	0.071	0.076	0.031	0.054	0.059
10/31/2002	0.017	0.051	0.072	0.080	0.034	0.055	0.063
11/30/2002	0.014	0.052	0.071	0.078	0.038	0.057	0.063
12/31/2002	0.013	0.048	0.071	0.076	0.035	0.057	0.063
01/31/2003	0.012	0.050	0.071	0.075	0.037	0.059	0.063
02/28/2003	0.011	0.047	0.069	0.072	0.036	0.058	0.061
03/31/2003	0.012	0.049	0.068	0.071	0.037	0.056	0.058
04/30/2003	0.012	0.048	0.066	0.069	0.036	0.054	0.057
05/31/2003	0.013	0.044	0.064	0.065	0.030	0.050	0.051
06/30/2003	0.012	0.045	0.062	0.063	0.033	0.050	0.051
07/31/2003	0.008	0.054	0.066	0.067	0.046	0.057	0.058
08/31/2003	0.008	0.053	0.068	0.071	0.045	0.059	0.062
09/30/2003	0.010	0.049	0.066	0.069	0.039	0.056	0.059
10/31/2003	0.008	0.052	0.064	0.068	0.043	0.056	0.059
11/30/2003	0.008	0.052	0.064	0.067	0.043	0.055	0.058
12/31/2003	0.010	0.051	0.063	0.066	0.041	0.053	0.056
01/31/2004	0.008	0.050	0.062	0.065	0.041	0.053	0.056
02/29/2004	0.007	0.048	0.062	0.063	0.041	0.054	0.056
03/31/2004	0.011	0.047	0.060	0.061	0.037	0.049	0.050
04/30/2004	0.010	0.053	0.064	0.065	0.043	0.054	0.055
05/31/2004	0.007	0.054	0.066	0.068	0.047	0.059	0.060
06/30/2004	0.010	0.053	0.065	0.068	0.044	0.055	0.059
07/31/2004	0.012	0.052	0.063	0.067	0.040	0.051	0.055
08/31/2004	0.013	0.049	0.061	0.065	0.036	0.048	0.051
09/30/2004	0.013	0.049	0.060	0.063	0.036	0.047	0.049

Table No. MJV-12

Panel C: Spread Between US 30-Day T-Bills and US Government Bond Yields and Utility Bonds Yields

Date	30 Day T-Bill Total Return	US LT Gov't Bond Yield	Moodys A Utility Bond Yield	Moodys Baa Utility Bond Yield	Spread (Gov't.- 30 day T-bill)	Spread (A Util- 30 day T-bill)	Spread (Baa Util- 30 day T-bill)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
10/31/2004	0.013	0.048	0.059	0.062	0.035	0.046	0.048
11/30/2004	0.018	0.050	0.060	0.062	0.032	0.042	0.043
12/31/2004	0.019	0.048	0.059	0.061	0.029	0.040	0.042
01/31/2005	0.019	0.047	0.058	0.060	0.027	0.038	0.040
02/28/2005	0.019	0.048	0.056	0.058	0.029	0.037	0.038
Average Spread -- January 1980 to February 2005					**0.021**	**0.036**	**0.040**
Average Spread -- January 1990 to August 1998					**0.023**	**0.033**	**0.036**
Average Spread -- January 1990 to December 2000					**0.020**	**0.032**	**0.034**
Average Spread -- January 1990 to February 2005					**0.024**	**0.037**	**0.040**
Average Spread -- December 2000 to December 2001					**0.016**	**0.038**	**0.040**
Average Spread -- December 2000 to December 2002					**0.026**	**0.047**	**0.052**
Average Spread -- December 2000 to February 2005					**0.032**	**0.049**	**0.053**
Average Spread -- January 2001 to December 2001					**0.018**	**0.039**	**0.042**
Average Spread -- January 2002 to December 2002					**0.038**	**0.057**	**0.064**
Average Spread -- January 2004 to February 2005					**0.037**	**0.048**	**0.050**

Sources and Notes:

[1] - [2]: Ibbotson Associates Yearbook.

[3] -[4]: Mergent Bond Records.

[5]: [2] - [1].

[6]: [3] - [1].

[7]: [4] - [1].

Table No. MJV-13

2004 Gas LDC Sample

Percentage of Revenue from Regulated Activity

Company		State	Restructuring Status	2004	2003	2002	2001	2000	Average
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Cascade Natural Gas Corp	*	WA	5	100%	100%	100%	100%	100%	100%
Keyspan Corp		NY	1	66%	64%	58%	54%	50%	59%
Laclede Group Inc	*	MO	5	100%	100%	100%	92%	93%	97%
Northwest Natural Gas Co	*	OR	5	98%	97%	97%	98%	100%	98%
Peoples Energy Corp	*	IL	3	66%	71%	72%	81%	79%	74%
South Jersey Industries Inc	*	NJ	1	70%	77%	82%	87%	87%	81%
Southwest Gas Corp	*	NJ	1	85%	84%	84%	85%	84%	85%
Wgl Holdings Inc		DC	1	62%	64%	59%	75%	83%	68%

Sources and Notes:

[1]: Compustat as of April 05.

[2]: Workpaper #1 to Table No. MJV-13.

[3] - [7]: Workpaper #2 to Table No. MJV-13; Panel's A - H.

[8]: {[3] + [4] + [5] + [6] + [7]} / 5.

* Companies marked with an asterisk represent the companies whose 5-year average revenues from regulated activities is greater than 70%.

Workpaper #1 to Table No. MJV-13

2004 Gas LDC Sample

Restructuring Status of Each State as of Dec. 04

State	Restructuring Status
AK	5
AL	5
AR	5
AZ	5
CA	2
CO	2
CT	5
DC	1
DE	6
FL	3
GA	2
HI	5
IA	4
ID	5
IL	3
IN	3
KS	4
KY	3
LA	5
MA	2
MD	2
ME	4
MI	2
MN	4
MO	5
MS	5
MT	3
NC	5
ND	5
NE	3
NH	4
NJ	1
NM	1
NV	4
NY	1
OH	2
OK	4
OR	5
PA	1
RI	5
SC	5
SD	3
TN	5
TX	5
UT	5
VA	2
VT	4
WA	5
WI	6
WV	1
WY	3

Sources and Notes:
"Status of Natural Gas Residential Choice Programs by State as of December 2004" by the Energy Information Administration, dated December, 2004.

1: Statewide unbundling - 100% eligibility.
2: Statewide unbundling - implementation phase.
3: Pilot programs / partial unbundling.
4: No unbundling - considering action.
5: No unbundling.
6: Pilot program discontinued.

http://www.eia.doe.gov/oil_gas/natural_gas/restructure/restructure.html

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel A: Cascade Natural Gas Corp ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues*	100%	318.08	302.76	320.98	335.81	241.94
Estimated % Regulated Revenues (includes *)	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Sources and Notes:
Cascade Natural Gas Corp's 2000 - 2004 10-Ks.
Revenue amounts reflect restated numbers in later 10-Ks.

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel B: KeySpan Corp ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues						
Gas Distribution*	66%	4407.29	4161.27	3163.76	3613.55	2555.79
Electric Services	26%	1738.66	1606.07	1645.79	1421.08	1444.71
Energy Services and Other	3%	193.92	166.38	208.62	1100.17	770.11
Gas Exploration and Production	4%	280.00	501.26	357.45	-	-
Energy Investments and Other	1%	46.99	113.12	90.78	498.32	310.10
Eliminations	0%	-16.39	-12.58	-1.23	-	-
Total Revenues	**100%**	**6650.47**	**6535.52**	**5465.17**	**6633.12**	**5080.70**
Estimated % Regulated Revenues (includes *)	**66%**	**66%**	**64%**	**58%**	**54%**	**50%**

Sources and Notes:
Keyspan Corp's 2000 - 2004 10-Ks.
Revenue amounts reflect restated numbers in later 10-Ks.
Segment revenues include intersegment revenues.

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel C: Laclede Group ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues						
(Gas) Utility*	100%	868.91	774.77	592.10	923.24	529.25
Non-Regulated Services	0%	2.58	2.39	2.52	-	-
All Other (non-utility)	-	-	-	-	78.87	36.88
Total Revenues	**100%**	**871.48**	**777.16**	**594.62**	**1002.11**	**566.13**
Estimated % Regulated Revenues (includes *)	**100%**	**100%**	**100%**	**100%**	**92%**	**93%**

Sources and Notes:
Laclede Group Inc's 2000 - 2004 10-Ks.
Revenue amounts reflect restated numbers in later 10-Ks.

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel D: Northwest Nat. Gas ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues						
Utility*	98%	301.769	278.856	279.414	271.47	257.36
Interstate Gas Storage	2%	6.423	9.036	7.944	-	-
Other	0%	0.168	0.174	0.186	-	-
Non-Utility Net Operating Revenues	-	-	-	-	4.54	0.59
Net Operating Revenues	**100%**	**308.36**	**288.066**	**287.544**	**276.011**	**257.95**
Estimated % Regulated Revenues (includes *)	**98%**	**98%**	**97%**	**97%**	**98%**	**100%**

Sources and Notes:
Northwest Natural Gas Co's 2000 - 2004 10-Ks.
Revenue amounts reflect restated numbers in later 10-Ks.

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel E: Peoples Energy ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues						
Gas Distribution*	66%	1494.46	1512.44	1067.30	1835.43	1116.14
Power Generation Segment	-	-	-	4.62	-	-
Midstream Services Segment	16%	362.85	306.83	193.00	131.96	132.72
Retail Energy Services Segment	14%	323.43	251.11	167.79	256.54	142.23
Oil and Gas Production Segment	5%	123.78	106.36	65.71	53.99	31.14
Other Segment	0%	0.26	0.20	0.05	0.12	0.04
Corporate and Adjustment	-2%	-44.58	-38.55	-15.93	-7.81	-4.74
Total Revenues	**100%**	**2260.20**	**2138.39**	**1482.53**	**2270.22**	**1417.53**
Estimated % Regulated Revenues (includes *)	**66%**	**66%**	**71%**	**72%**	**81%**	**79%**

Sources and Notes:
Peoples Energy Corp's 2000 - 2004 10-Ks.
Revenue amounts reflect restated numbers in later 10-Ks.

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel F: South Jersey Ind. ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues						
Gas Utility Operations*	61%	502.47	526.85	415.64	475.46	445.82
Wholesale Gas Operations	2%	18.06	10.56	5.00	6.14	-
Retail Gas and Other Operations	26%	213.79	175.51	112.00	96.75	82.76
Retail Electric Operations*	9%	72.85	14.87	2.70	-	-
On-site Energy Production	3%	20.87	12.74	0.85	-	-
Appliance Service Operations	2%	12.73	9.60	8.39	-	-
Intersegment Revenues	-3%	-21.69	-44.92	-32.69	-32.37	-15.96
Total Operatings Revenues	**100%**	**819.08**	**705.20**	**511.89**	**545.99**	**512.62**
Estimated % Regulated Revenues (includes *)	**70%**	**70%**	**77%**	**82%**	**87%**	**87%**

Sources and Notes:

South Jersey Industries Inc's 2000 - 2004 10-Ks.

Revenue amounts reflect restated numbers in later 10-Ks.

Revenues "Retail Electric Operations" are assumed to be generated from regulated activities.

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel G: Southwest Gas ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues:						
Gas Operating Revenues*	85%	1262.05	1034.35	1115.90	1193.10	870.71
Constructions Revenues	15%	215.01	196.65	205.01	203.59	163.38
Total Operating Revenues	**100%**	**1477.06**	**1231.00**	**1320.91**	**1396.69**	**1034.09**
Estimated % Regulated Revenues (includes *)	**85%**	**85%**	**84%**	**84%**	**85%**	**84%**

Sources and Notes:
Southwest Gas Corp's 2000 - 2004 10-Ks.
Revenue amounts reflect restated numbers in later 10-Ks.
Segment revenues include intersegment revenues.

Workpaper #2 to Table No. MJV-13

2004 Gas LDC Sample: Revenue Breakdown

Panel H: WGL Holdings Inc. ($MM)

	% total 2004	2004	2003	2002	2001	2000
Operating Revenues						
Regulated Utility*	62%	1293.68	1313.04	938.80	1446.46	1031.11
Retail Energy Marketing	38%	789.86	726.23	595.87	419.23	166.71
HVAC	1%	30.12	35.52	61.89	70.28	47.47
Other Activities	0%	1.67	1.44	1.92	3.56	3.91
Eliminations / Other	-1%	-25.73	-11.98	-13.67	-	-
Total Operating Revenues	**100%**	**2089.60**	**2064.25**	**1584.80**	**1939.52**	**1249.19**
Estimated % Regulated Revenues (includes *)	**62%**	**62%**	**64%**	**59%**	**75%**	**83%**

Sources and Notes:
Wgl Holdings Inc's 2000 - 2004 10-Ks.
Revenue amounts reflect restated numbers in later 10-Ks.

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel A: Cascade Natural Gas Corp

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$123	$123	$119	$118	$125	$125	[a]
Shares Outstanding (in millions) - Common	11	11	11	11	11	11	[b]
Price per Share - Common	$20.23	$21.31	$21.47	$20.07	$21.74	$19.99	[c]
Market Value of Common Equity	$228	$241	$240	$222	$240	$221	[d] = [b] x [c].
Market to Book Value of Common Equity	1.86	1.96	2.02	1.88	1.92	1.77	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[f]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$86	$86	$67	$62	$67	$72	[h]
Current Liabilities	$116	$116	$83	$50	$60	$76	[i]
Current Portion of Long-Term Debt	$14	$14	$22	$0	$0	$0	[j]
Net Working Capital	($16)	($16)	$6	$12	$7	($4)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$34	$34	$4	$0	$40	$2	[l]
Adjusted Short-Term Debt	$16	$16	$0	$0	$0	$2	[m] = See Sources and Notes.
Long-Term Debt	$129	$129	$139	$165	$165	$125	[n]
Book Value of Long-Term Debt	$143	$143	$161	$165	$165	$125	[o] = [n] + [j].
Market Value of Long-Term Debt	$143	$143	$161	$165	$165	$125	[p] = [o].
Market Value of Debt	$158	$158	$161	$165	$165	$127	[q] = [p] + [m].
MARKET VALUE OF FIRM							
	$387	$399	$401	$387	$405	$347	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	59.04%	60.29%	59.86%	57.34%	59.28%	63.57%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	[t] = [g] / [r].
Debt - Market Value Ratio	40.96%	39.71%	40.14%	42.66%	40.72%	36.43%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-17.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel B: Keyspan Corp

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$3,895	$3,895	$3,662	$2,945	$2,891	$2,816	[a]
Shares Outstanding (in millions) - Common	161	161	160	142	139	136	[b]
Price per Share - Common	$39.12	$39.44	$36.77	$35.21	$34.64	$42.13	[c]
Market Value of Common Equity	$6,291	$6,342	$5,871	$5,014	$4,830	$5,744	[d] = [b] x [c].
Market to Book Value of Common Equity	1.62	1.63	1.60	1.70	1.67	2.04	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$20	$20	$84	$84	$84	$84	[f]
Market Value of Preferred Equity	$20	$20	$84	$84	$84	$84	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$3,079	$3,079	$2,387	$2,216	$1,998	$2,403	[h]
Current Liabilities	$2,282	$2,282	$1,849	$2,220	$2,385	$2,974	[i]
Current Portion of Long-Term Debt	$16	$16	$1	$11	$1	$5	[j]
Net Working Capital	$812	$812	$540	$8	($385)	($565)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$912	$912	$482	$916	$1,048	$1,300	[l]
Adjusted Short-Term Debt	$0	$0	$0	$0	$385	$565	[m] = See Sources and Notes.
Long-Term Debt	$4,419	$4,419	$5,611	$5,224	$4,698	$4,275	[n]
Book Value of Long-Term Debt	$4,435	$4,435	$5,613	$5,235	$4,699	$4,280	[o] = [n] + [j].
Market Value of Long-Term Debt	$4,435	$4,435	$5,613	$5,235	$4,699	$4,280	[p] = [o].
Market Value of Debt	$4,435	$4,435	$5,613	$5,235	$5,084	$4,846	[q] = [p] + [m].
MARKET VALUE OF FIRM	$10,746	$10,797	$11,568	$10,334	$9,998	$10,674	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	58.55%	58.74%	50.76%	48.52%	48.31%	53.81%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	0.18%	0.18%	0.72%	0.81%	0.84%	0.79%	[t] = [g] / [r].
Debt - Market Value Ratio	41.27%	41.08%	48.52%	50.66%	50.85%	45.40%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-17.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel C: Laclede Group Inc

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$369	$369	$309	$295	$289	$295	[a]
Shares Outstanding (in millions) - Common	21	21	19	19	19	19	[b]
Price per Share - Common	$29.80	$31.19	$29.32	$24.20	$23.78	$23.85	[c]
Market Value of Common Equity	$627	$656	$561	$459	$449	$450	[d] = [b] x [c].
Market to Book Value of Common Equity	1.70	1.78	1.81	1.55	1.55	1.53	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$1	$1	$1	$1	$1	$2	[f]
Market Value of Preferred Equity	$1	$1	$1	$1	$1	$2	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$465	$465	$378	$300	$242	$349	[h]
Current Liabilities	$401	$401	$455	$360	$262	$363	[i]
Current Portion of Long-Term Debt	$25	$25	$0	$25	$0	$0	[j]
Net Working Capital	$89	$89	($77)	($35)	($19)	($14)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$71	$71	$218	$162	$117	$127	[l]
Adjusted Short-Term Debt	$0	$0	$77	$35	$19	$14	[m] = See Sources and Notes.
Long-Term Debt	$380	$380	$280	$305	$284	$234	[n]
Book Value of Long-Term Debt	$406	$406	$280	$330	$284	$234	[o] = [n] + [j].
Market Value of Long-Term Debt	$406	$406	$280	$330	$284	$234	[p] = [o].
Market Value of Debt	$406	$406	$357	$365	$304	$249	[q] = [p] + [m].
MARKET VALUE OF FIRM							
	$1,033	$1,062	$919	$825	$754	$701	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	60.64%	61.73%	61.01%	55.64%	59.53%	64.24%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	0.11%	0.10%	0.14%	0.15%	0.17%	0.25%	[t] = [g] / [r].
Debt - Market Value Ratio	39.25%	38.17%	38.86%	44.21%	40.30%	35.51%	[u] = [q] / [r].

Sources and Notes:

Compustat as of April 2005.

The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.

Prices are reported in Workpaper #1 to Table No. MJV-17.

[m] =

(1): 0 if [k] > 0.

(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].

(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel D: Northwest Natural Gas Co

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$569	$569	$506	$483	$468	$452	[a]
Shares Outstanding (in millions) - Common	28	28	26	26	25	25	[b]
Price per Share - Common	$35.86	$33.68	$31.01	$27.18	$25.79	$26.79	[c]
Market Value of Common Equity	$988	$928	$804	$695	$651	$676	[d] = [b] x [c].
Market to Book Value of Common Equity	1.74	1.63	1.59	1.44	1.39	1.49	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$8	$34	$35	[f]
Market Value of Preferred Equity	$0	$0	$0	$8	$34	$35	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$237	$237	$200	$194	$210	$187	[h]
Current Liabilities	$267	$267	$214	$205	$274	$221	[i]
Current Portion of Long-Term Debt	$15	$15	$0	$20	$40	$20	[j]
Net Working Capital	($15)	($15)	($15)	$9	($23)	($14)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$103	$103	$85	$70	$108	$56	[l]
Adjusted Short-Term Debt	$15	$15	$15	$0	$23	$14	[m] = See Sources and Notes.
Long-Term Debt	$484	$484	$500	$446	$378	$401	[n]
Book Value of Long-Term Debt	$499	$499	$500	$466	$418	$421	[o] = [n] + [j].
Market Value of Long-Term Debt	$499	$499	$500	$466	$418	$421	[p] = [o].
Market Value of Debt	$514	$514	$515	$466	$442	$435	[q] = [p] + [m].
MARKET VALUE OF FIRM	$1,502	$1,442	$1,319	$1,170	$1,126	$1,145	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	65.77%	64.34%	60.95%	59.46%	57.77%	59.01%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	0.71%	3.02%	3.03%	[t] = [g] / [r].
Debt - Market Value Ratio	34.23%	35.66%	39.05%	39.84%	39.21%	37.96%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-17.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel E: Peoples Energy Corp

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$884	$884	$863	$815	$809	$766	[a]
Shares Outstanding (in millions) - Common	38	38	37	36	35	35	[b]
Price per Share ($) - Common	$42.72	$44.28	$42.02	$38.55	$38.18	$45.11	[c]
Market Value of Common Equity	$1,618	$1,677	$1,554	$1,371	$1,353	$1,596	[d] = [b] x [c].
Market to Book Value of Common Equity	1.83	1.90	1.80	1.68	1.67	2.08	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[f]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$801	$801	$702	$581	$562	$927	[h]
Current Liabilities	$715	$715	$744	$998	$797	$1,308	[i]
Current Portion of Long-Term Debt	$0	$0	$0	$90	$100	$0	[j]
Net Working Capital	$85	$85	($42)	($327)	($135)	($381)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$56	$56	$208	$288	$507	$568	[l]
Adjusted Short-Term Debt	$0	$0	$42	$288	$135	$381	[m] = See Sources and Notes.
Long-Term Debt	$897	$897	$846	$529	$644	$419	[n]
Book Value of Long-Term Debt	$897	$897	$846	$619	$744	$419	[o] = [n] + [j].
Market Value of Long-Term Debt	$897	$897	$846	$619	$744	$419	[p] = [o].
Market Value of Debt	$897	$897	$889	$907	$879	$800	[q] = [p] + [m].
MARKET VALUE OF FIRM	$2,515	$2,574	$2,443	$2,278	$2,233	$2,396	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	64.33%	65.14%	63.62%	60.18%	60.61%	66.61%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	[t] = [g] / [r].
Debt - Market Value Ratio	35.67%	34.86%	36.38%	39.82%	39.39%	33.39%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-17.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel F: South Jersey Industries Inc

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$344	$344	$298	$238	$220	$202	[a]
Shares Outstanding (in millions) - Common	14	14	13	12	12	12	[b]
Price per Share ($) - Common	$56.20	$52.46	$40.42	$33.06	$33.09	$29.44	[c]
Market Value of Common Equity	$780	728.14	534.66	403.53	392.46	338.53	[d] = [b] x [c].
Market to Book Value of Common Equity	2.26	2.11	1.79	1.70	1.78	1.68	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$2	$2	$2	$2	$2	$2	[f]
Market Value of Preferred Equity	$2	$2	$2	$2	$2	$2	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$284	$284	$266	$213	$222	$175	[h]
Current Liabilities	$285	$285	$268	$317	$310	$257	[i]
Current Portion of Long-Term Debt	$5	$5	$5	$11	$10	$12	[j]
Net Working Capital	$4	$4	$3	($93)	($78)	($70)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$92	$92	$113	$167	$152	$121	[l]
Adjusted Short-Term Debt	$0	$0	$0	$93	$78	$70	[m] = See Sources and Notes.
Long-Term Debt	$329	$329	$309	$273	$294	$240	[n]
Book Value of Long-Term Debt	$334	$334	$314	$284	$304	$252	[o] = [n] + [j].
Market Value of Long-Term Debt	$334	$334	$314	$284	$304	$252	[p] = [o].
Market Value of Debt	$334	$334	$314	$377	$382	$322	[q] = [p] + [m].
MARKET VALUE OF FIRM	$1,116	$1,064	$850	$782	$776	$663	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	69.90%	68.43%	62.87%	51.59%	50.54%	51.10%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	0.15%	0.16%	0.20%	0.22%	0.22%	0.27%	[t] = [g] / [r].
Debt - Market Value Ratio	29.95%	31.41%	36.93%	48.19%	49.24%	48.63%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-17.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel G: Southwest Gas Corp

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$706	$706	$630	$596	$561	$533	[a]
Shares Outstanding (in millions) - Common	37	37	34	33	32	32	[b]
Price per Share ($) - Common	$24.55	$25.49	$22.89	$23.14	$22.69	$21.91	[c]
Market Value of Common Equity	$903	$938	$784	$770	$737	$695	[d] = [b] x [c].
Market to Book Value of Common Equity	1.28	1.33	1.24	1.29	1.31	1.30	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[f]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$432	$432	$281	$262	$400	$403	[h]
Current Liabilities	$483	$483	$310	$313	$653	$482	[i]
Current Portion of Long-Term Debt	$30	$30	$6	$9	$308	$8	[j]
Net Working Capital	($21)	($21)	($23)	($43)	$55	($70)	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$100	$100	$52	$53	$93	$131	[l]
Adjusted Short-Term Debt	$21	$21	$23	$43	$0	$70	[m] = See Sources and Notes.
Long-Term Debt	$1,263	$1,263	$1,221	$1,152	$856	$956	[n]
Book Value of Long-Term Debt	$1,293	$1,293	$1,228	$1,161	$1,164	$965	[o] = [n] + [j].
Market Value of Long-Term Debt	$1,293	$1,293	$1,228	$1,161	$1,164	$965	[p] = [o].
Market Value of Debt	$1,314	$1,314	$1,250	$1,204	$1,164	$1,035	[q] = [p] + [m].
MARKET VALUE OF FIRM							
	$2,217	$2,252	$2,034	$1,974	$1,901	$1,730	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	40.74%	41.65%	38.53%	39.03%	38.78%	40.17%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	[t] = [g] / [r].
Debt - Market Value Ratio	59.26%	58.35%	61.47%	60.97%	61.22%	59.83%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-17.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-14

Market Value of the 2004 Gas LDC Sample

Panel H: Wgl Holdings Inc

($MM)

	DCF Capital Structure	Year End, 2004	Year End, 2003	Year End, 2002	Year End, 2001	Year End, 2000	Notes
MARKET VALUE OF COMMON EQUITY							
Book Value, Common Shareholder's Equity	$881	$881	$843	$802	$803	$748	[a]
Shares Outstanding (in millions) - Common	49	49	49	49	49	46	[b]
Price per Share ($) - Common	$31.12	$31.01	$28.11	$24.01	$29.22	$30.59	[c]
Market Value of Common Equity	$1,515	$1,509	$1,367	$1,167	$1,419	$1,422	[d] = [b] x [c].
Market to Book Value of Common Equity	1.72	1.71	1.62	1.45	1.77	1.90	[e] = [d] / [a].
MARKET VALUE OF PREFERRED EQUITY							
Book Value of Preferred Equity	$28	$28	$28	$28	$28	$28	[f]
Market Value of Preferred Equity	$28	$28	$28	$28	$28	$28	[g] = [f].
MARKET VALUE OF DEBT							
Current Assets	$631	$631	$591	$513	$476	$641	[h]
Current Liabilities	$627	$627	$552	$529	$422	$594	[i]
Current Portion of Long-Term Debt	$61	$61	$12	$42	$48	$2	[j]
Net Working Capital	$65	$65	$51	$26	$102	$48	[k] = [h] - ([i] - [j]).
Notes Payable (Short-Term Debt)	$96	$96	$167	$91	$134	$161	[l]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	[m] = See Sources and Notes.
Long-Term Debt	$574	$574	$638	$623	$613	$578	[n]
Book Value of Long-Term Debt	$634	$634	$650	$666	$661	$579	[o] = [n] + [j].
Market Value of Long-Term Debt	$634	$634	$650	$666	$661	$579	[p] = [o].
Market Value of Debt	$634	$634	$650	$666	$661	$579	[q] = [p] + [m].
MARKET VALUE OF FIRM							
	$2,177	$2,172	$2,045	$1,860	$2,108	$2,029	[r] = [d] + [g] + [q].
DEBT AND EQUITY TO MARKET VALUE RATIOS							
Common Equity - Market Value Ratio	69.57%	69.49%	66.85%	62.71%	67.30%	70.06%	[s] = [d] / [r].
Preferred Equity - Market Value Ratio	1.29%	1.30%	1.38%	1.51%	1.34%	1.39%	[t] = [g] / [r].
Debt - Market Value Ratio	29.13%	29.21%	31.78%	35.78%	31.36%	28.56%	[u] = [q] / [r].

Sources and Notes:
Compustat as of April 2005.
The DCF Capital structure is calculated using Year End 2004 balance sheet information and a 15-trading day average price ending on 4/1/2005.
Prices are reported in Workpaper #1 to Table No. MJV-17.
[m] =
(1): 0 if [k] > 0.
(2): The absolute value of [k] if [k] < 0 and |[k]| < [l].
(3): [l] if [k] < 0 and |[k]| > [l].

Table No. MJV-15

2004 Gas LDC Sample

Capital Structure Summary

Company	DCF Capital Structure			5-Year Average Capital Structure		
	Common Equity - Value Ratio [1]	Preferred Equity - Value Ratio [2]	Debt - Value Ratio [3]	Common Equity - Value Ratio [4]	Preferred Equity - Value Ratio [5]	Debt - Value Ratio [6]
Cascade Natural Gas Corp	0.59	-	0.41	0.60	-	0.40
Keyspan Corp	0.59	0.00	0.41	0.52	0.01	0.47
Laclede Group Inc	0.61	0.00	0.39	0.60	0.00	0.39
Northwest Natural Gas Co	0.66	-	0.34	0.60	0.01	0.38
Peoples Energy Corp	0.64	-	0.36	0.63	-	0.37
South Jersey Industries Inc	0.70	0.00	0.30	0.57	0.00	0.43
Southwest Gas Corp	0.41	-	0.59	0.40	-	0.60
Wgl Holdings Inc	0.70	0.01	0.29	0.67	0.01	0.31

Sources and Notes:
[1], [4]: Workpaper #1 to Table No. MJV-15.
[2], [5]: Workpaper #2 to Table No. MJV-15.
[3], [6]: Workpaper #3 to Table No. MJV-15.
Values in this table may not add up to one because of rounding.

Workpaper #1 to Table No. MJV-15

2004 Gas LDC Sample

Calculation of the Average Common Equity - Market Value Ratio from 2000 to 2004

Company	DCF Capital Structure [1]	2004 [2]	2003 [3]	2002 [4]	2001 [5]	2000 [6]	5-Year Average [7]
Cascade Natural Gas Corp	0.59	0.60	0.60	0.57	0.59	0.64	0.60
Keyspan Corp	0.59	0.59	0.51	0.49	0.48	0.54	0.52
Laclede Group Inc	0.61	0.62	0.61	0.56	0.60	0.64	0.60
Northwest Natural Gas Co	0.66	0.64	0.61	0.59	0.58	0.59	0.60
Peoples Energy Corp	0.64	0.65	0.64	0.60	0.61	0.67	0.63
South Jersey Industries Inc	0.70	0.68	0.63	0.52	0.51	0.51	0.57
Southwest Gas Corp	0.41	0.42	0.39	0.39	0.39	0.40	0.40
Wgl Holdings Inc	0.70	0.69	0.67	0.63	0.67	0.70	0.67

Sources and Notes:
[1] - [6]: Table No. MJV-14; Panels A - H, [s].
[7]: { [2] + [3] + [4] + [5] + [6] } / 5.

Workpaper #2 to Table No. MJV-15

2004 Gas LDC Sample

Calculation of the Average Preferred Equity - Market Value Ratio from 2000 to 2004

Company	DCF Capital Structure [1]	2004 [2]	2003 [3]	2002 [4]	2001 [5]	2000 [6]	5-Year Average [7]
Cascade Natural Gas Corp	-	-	-	-	-	-	-
Keyspan Corp	0.00	0.00	0.01	0.01	0.01	0.01	0.01
Laclede Group Inc	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Northwest Natural Gas Co	-	-	-	0.01	0.03	0.03	0.01
Peoples Energy Corp	-	-	-	-	-	-	-
South Jersey Industries Inc	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Southwest Gas Corp	-	-	-	-	-	-	-
Wgl Holdings Inc	0.01	0.01	0.01	0.02	0.01	0.01	0.01

Sources and Notes:
[1] - [6]: Table No. MJV-14; Panel's A - H, [t].
[7]: { [2] + [3] + [4] + [5] + [6] } / 5.
Values reported as 0.00 have an insignificant amount of preferred equity.

Workpaper #3 to Table No. MJV-15

2004 Gas LDC Sample

Calculation of the Average Debt - Market Value Ratio from 2000 to 2004

Company	DCF Capital Structure [1]	2004 [2]	2003 [3]	2002 [4]	2001 [5]	2000 [6]	5-Year Average [7]
Cascade Natural Gas Corp	0.41	0.40	0.40	0.43	0.41	0.36	0.40
Keyspan Corp	0.41	0.41	0.49	0.51	0.51	0.45	0.47
Laclede Group Inc	0.39	0.38	0.39	0.44	0.40	0.36	0.39
Northwest Natural Gas Co	0.34	0.36	0.39	0.40	0.39	0.38	0.38
Peoples Energy Corp	0.36	0.35	0.36	0.40	0.39	0.33	0.37
South Jersey Industries Inc	0.30	0.31	0.37	0.48	0.49	0.49	0.43
Southwest Gas Corp	0.59	0.58	0.61	0.61	0.61	0.60	0.60
Wgl Holdings Inc	0.29	0.29	0.32	0.36	0.31	0.29	0.31

Sources and Notes:

[1] - [6]: Table No. MJV-14; Panel's A - H, [u].

[7]: { [2] + [3] + [4] + [5] + [6] } / 5.

Table No. MJV-16

2004 Gas LDC Sample

Combined I/B/E/S and Value Line Estimated Growth Rates

	I/B/E/S		Value Line			
Company	I/B/E/S Long-Term Growth Rate	Number of Estimates	EPS Fiscal Year '06 Estimate	EPS Fiscal Year '08 to '10 Estimate	Annualized Growth Rate	Combined I/B/E/S and Value Line Growth Rate
	[1]	[2]	[3]	[4]	[5]	[6]
Cascade Natural Gas Corp	4.5%	2	$1.25	$1.60	8.6%	5.9%
Keyspan Corp	4.3%	5	$2.50	$3.20	8.6%	5.0%
Laclede Group Inc	4.2%	2	$1.95	$2.25	4.9%	4.4%
Northwest Natural Gas Co	5.5%	3	$2.25	$2.50	3.6%	5.0%
Peoples Energy Corp	4.3%	4	$2.75	$3.00	2.9%	4.0%
South Jersey Industries Inc	5.0%	2	$3.40	$4.00	5.6%	5.2%
Southwest Gas Corp	6.5%	3	$1.90	$2.35	7.3%	6.7%
Wgl Holdings Inc	3.9%	5	$2.05	$2.60	8.2%	4.6%

Sources and Notes:

[1] - [2]: Workpaper #1 to Table No. MJV-16.

[3] - [4]: Workpaper #2 to Table No. MJV-16.

[5]: ([4] / [3]) ^ (1/3) - 1.

[6]: ([1] x [2] + [5]) / ([2] +1).

Workpaper #1 to Table No. MJV-16

2004 Gas LDC Sample

I/B/E/S Earnings Per Share Data

Company	EPS Fiscal Year-End 2004 Observed [1]	EPS Fiscal Year-End 2005 Estimate [2]	EPS Fiscal Year-End 2006 Estimate [3]	EPS Fiscal Year-End 2007 Estimate [4]	Growth Rate Long-Term [5]	Number of Long-Term Growth Rate Estimates [6]
Cascade Natural Gas Corp	$1.19	$1.15	$1.25	n/a	4.5%	2
Keyspan Corp	$2.69	$2.34	$2.44	$2.53	4.3%	5
Laclede Group Inc	$1.90	$1.89	$2.00	n/a	4.2%	2
Northwest Natural Gas Co	$1.88	$2.13	$2.27	n/a	5.5%	3
Peoples Energy Corp	$2.56	$2.74	$2.84	n/a	4.3%	4
South Jersey Industries	$3.02	$3.19	$3.31	n/a	5.0%	2
Southwest Gas Corp	$1.59	$1.58	$1.78	$1.77	6.5%	3
Wgl Holdings Inc	$1.84	$1.88	$1.93	$1.99	3.9%	5

Sources and Notes:
[1] - [6]: I/B/E/S April 1, 2005.

Workpaper #2 to Table No. MJV-16

2004 Gas LDC Sample

Value Line Earnings Per Share Data

Company	EPS Fiscal Year 2004 Observed [1]	EPS Fiscal Year 2005 Estimate [2]	EPS Fiscal Year 2006 Estimate [3]	EPS 2008 - 2010 Estimate [4]
Cascade Natural Gas Corp	$1.19	$1.15	$1.25	$1.60
Keyspan Corp	$2.71	$2.35	$2.50	$3.20
Laclede Group Inc	$1.82	$1.85	$1.95	$2.25
Northwest Natural Gas Co	$1.86	$2.10	$2.25	$2.50
Peoples Energy Corp	$2.18	$2.65	$2.75	$3.00
South Jersey Industries Inc	$3.11	$3.25	$3.40	$4.00
Southwest Gas Corp	$1.55	$1.70	$1.90	$2.35
Wgl Holdings Inc	$1.98	$1.90	$2.05	$2.60

Sources and Notes:
[1] - [4]: Value Line Investment Survey; March 18, 2005.

Workpaper #3 to Table No. MJV-16

Estimated Growth Rates of the 2004 Gas LDC Sample

Panel A: Using I/B/E/S Forecasts

Company	Growth Rate: FY 04 - 05 [1]	Growth Rate: FY 05 - 06 [2]	Growth Rate: FY 06 - 07 [3]	Growth Rate: FY 07 - 08 [4]	Growth Rate: FY 08 - 09 [5]	Growth Rate Long-Term [6]	Number of Long-Term Growth Rate Estimates [7]
Cascade Natural Gas Corp	-3.4%	8.7%	5.9%	5.9%	5.9%	4.5%	2
Keyspan Corp	-13.0%	4.3%	3.7%	14.6%	14.6%	4.3%	5
Laclede Group Inc	-0.5%	5.8%	5.3%	5.3%	5.3%	4.2%	2
Northwest Natural Gas Co	13.3%	6.6%	2.7%	2.7%	2.7%	5.5%	3
Peoples Energy Corp	7.0%	3.6%	3.6%	3.6%	3.6%	4.3%	4
South Jersey Industries	5.6%	3.8%	5.2%	5.2%	5.2%	5.0%	2
Southwest Gas Corp	-0.6%	12.7%	-0.6%	10.9%	10.9%	6.5%	3
Wgl Holdings Inc	2.2%	2.7%	3.1%	5.8%	5.8%	3.9%	5

Sources and Notes:

[1]: From Workpaper #1 to Table No. MJV-16: ([2] - [1]) / [1].

[2]: From Workpaper #1 to Table No. MJV-16: ([3] - [2]) / [2].

[3]: From Workpaper #1 to Table No. MJV-16:

If [4] is n/a then {([1] x ((1 + [5]) ^ 5) / [3]) ^ (1/3)} - 1; otherwise, ([4] - [3]) / [3].

[4]: From Workpaper #1 to Table No. MJV-16:

If [4] is n/a then Workpaper #3 to Table No. MJV-16, Panel A, [3]; otherwise {([1] x ((1 + [5]) ^ 5) / [4]) ^ (1/2)} - 1.

[5]: [4].

[6], [7]: Workpaper #1 to Table No. MJV-16, [5] and [6].

Workpaper #3 to Table No. MJV-16

Estimated Growth Rates of the 2004 Gas LDC Sample

Panel B: Using Value Line Forecasts

Company	Growth Rate: FY 04 - 05 [1]	Growth Rate: FY 05 - 06 [2]	Growth Rate: FY 06 - 07 [3]	Growth Rate: FY 07 - 08 [4]	Growth Rate: FY 08 - 09 [5]	Growth Rate Long-Term [6]
Cascade Natural Gas Corp	-3.4%	8.7%	8.6%	8.6%	8.6%	8.6%
Keyspan Corp	-13.3%	6.4%	8.6%	8.6%	8.6%	8.6%
Laclede Group Inc	1.6%	5.4%	4.9%	4.9%	4.9%	4.9%
Northwest Natural Gas Co	12.9%	7.1%	3.6%	3.6%	3.6%	3.6%
Peoples Energy Corp	21.6%	3.8%	2.9%	2.9%	2.9%	2.9%
South Jersey Industries Inc	4.5%	4.6%	5.6%	5.6%	5.6%	5.6%
Southwest Gas Corp	9.7%	11.8%	7.3%	7.3%	7.3%	7.3%
Wgl Holdings Inc	-4.0%	7.9%	8.2%	8.2%	8.2%	8.2%

Sources and Notes:
[1]: From Workpaper #2 to Table No. MJV-16: ([2] - [1]) / [1].
[2]: From Workpaper #2 to Table No. MJV-16: ([3] - [2]) / [2].
[3] - [5]: From Workpaper #2 to Table No. MJV-16: ([4] / [3])^(1/3) - 1.
[6]: [5].

Workpaper #3 to Table No. MJV-16

Estimated Growth Rates of the 2004 Gas LDC Sample

Panel C: Combined I/B/E/S and Value Line Forecasts

Company	Combined Growth Rate: FY 04 - 05 [1]	Combined Growth Rate: FY 05 - 06 [2]	Combined Growth Rate: FY 06 - 07 [3]	Combined Growth Rate: FY 07 - 08 [4]	Combined Growth Rate: FY 08 - 09 [5]	Combined Growth Rate: Long-Term [6]	Number of Estimates [7]
Cascade Natural Gas Corp	-3.4%	8.7%	6.8%	6.8%	6.8%	5.9%	3
Keyspan Corp	-13.1%	4.6%	4.5%	13.6%	13.6%	5.0%	6
Laclede Group Inc	0.2%	5.7%	5.1%	5.1%	5.1%	4.4%	3
Northwest Natural Gas Co	13.2%	6.7%	2.9%	2.9%	2.9%	5.0%	4
Peoples Energy Corp	9.9%	3.7%	3.5%	3.5%	3.5%	4.0%	5
South Jersey Industries Inc	5.3%	4.0%	5.3%	5.3%	5.3%	5.2%	3
Southwest Gas Corp	1.9%	12.4%	1.4%	10.0%	10.0%	6.7%	4
Wgl Holdings Inc	1.1%	3.5%	4.0%	6.2%	6.2%	4.6%	6

Sources and Notes:

I/B/E/S forecasts are weighted by the number of I/B/E/S long-term growth rate estimates, and Value Line estimates are weighted by one.

[1] - [6]: Weighted average of I/B/E/S and Value Line forecasts.

(The I/B/E/S Estimate from Workpaper #3 to Table No. MJV-16; Panel A x the number of I/B/E/S estimates + the Value Line Estimate from Workpaper #3 to Table No. MJV-16; Panel B) / [7].

[7]: The Number of I/B/E/S long-term growth rate estimates plus one for the Value Line estimate.

Table No. MJV-17

DCF Cost of Equity of the 2004 Gas LDC Sample

Panel A: Simple DCF Method (Quarterly)

Company	Stock Price [1]	Quarterly Dividend Q1, 2005 [2]	Annualized Dividend Yield [3]	Combined I/B/E/S and Value Line Long-Term Growth Rate [4]	Quarterly Growth Rate [5]	DCF Cost of Equity [6]
Cascade Natural Gas Corp	$20.23	$0.24	5.02%	5.9%	1.4%	11.0%
Keyspan Corp	$39.12	$0.45	4.89%	5.0%	1.2%	10.0%
Laclede Group Inc	$29.80	$0.34	4.84%	4.4%	1.1%	9.3%
Northwest Natural Gas Co	$35.86	$0.32	3.81%	5.0%	1.2%	8.9%
Peoples Energy Corp	$42.72	$0.55	5.31%	4.0%	1.0%	9.4%
South Jersey Industries Inc	$56.20	$0.43	3.18%	5.2%	1.3%	8.4%
Southwest Gas Corp	$24.55	$0.20	3.56%	6.7%	1.6%	10.3%
Wgl Holdings Inc	$31.12	$0.32	4.37%	4.6%	1.1%	9.1%

Sources and Notes:
[1]: Workpaper #1 to Table No. MJV-17.
[2]: Workpaper #2 to Table No. MJV-17.
[3]: [2] x 4 x (1 + [4]) / [1].
[4]: Workpaper #3 to Table No. MJV-16; Panel C.
[5]: {(1 + [4]) ^ (1/4)} - 1.
[6]: {(([2] / [1]) x (1 + [5]) + [5] + 1) ^ 4} - 1.

Table No. MJV-17

DCF Cost of Equity of the 2004 Gas LDC Sample

Panel B: Multi-Stage DCF (Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	Stock Price [1]	Quarterly Dividend Q1, 2005 [2]	Combined Growth Rate: FY 04 - 05 [3]	Combined Growth Rate: FY 05 - 06 [4]	Combined Growth Rate: FY 06 - 07 [5]	Combined Growth Rate: FY 07 - 08 [6]	Combined Growth Rate: FY 08 - 09 [7]	Combined Growth Rate: FY 09 - 10 [8]	Combined Growth Rate: FY 10 - 11 [9]	Combined Growth Rate: FY 11 - 12 [10]	Combined Growth Rate: FY 12 - 13 [11]	Combined Growth Rate: FY 13 - 14 [12]	GDP Long-Term Growth Rate [13]	DCF Cost of Equity [14]
Cascade Natural Gas Corp	$20.23	$0.24	-3.4%	8.7%	6.8%	6.8%	6.8%	5.8%	5.7%	5.6%	5.5%	5.4%	5.3%	10.4%
Keyspan Corp	$39.12	$0.45	-13.1%	4.6%	4.5%	13.6%	13.6%	5.1%	5.1%	5.2%	5.2%	5.3%	5.3%	10.1%
Laclede Group Inc	$29.80	$0.34	0.2%	5.7%	5.1%	5.1%	5.1%	4.6%	4.7%	4.9%	5.0%	5.2%	5.3%	9.9%
Northwest Natural Gas Co	$35.86	$0.32	13.2%	6.7%	2.9%	2.9%	2.9%	5.1%	5.1%	5.2%	5.2%	5.3%	5.3%	9.1%
Peoples Energy Corp	$42.72	$0.55	9.9%	3.7%	3.5%	3.5%	3.5%	4.2%	4.5%	4.7%	4.9%	5.1%	5.3%	10.4%
South Jersey Industries Inc	$56.20	$0.43	5.3%	4.0%	5.3%	5.3%	5.3%	5.2%	5.2%	5.2%	5.3%	5.3%	5.3%	8.4%
Southwest Gas Corp	$24.55	$0.20	1.9%	12.4%	1.4%	10.0%	10.0%	6.5%	6.2%	6.0%	5.8%	5.5%	5.3%	9.2%
Wgl Holdings Inc	$31.12	$0.32	1.1%	3.5%	4.0%	6.2%	6.2%	4.7%	4.8%	5.0%	5.1%	5.2%	5.3%	9.5%

Sources and Notes:

[1]: Workpaper #1 to Table No. MJV-17.

[2]: Workpaper #2 to Table No. MJV-17.

[3] - [7]: Workpaper #3 to Table No. MJV-16; Panel C.

The Combined I/B/E/S and ValueLine Long-Term Growth Rate (Combined Rate) is from Workpaper #3 to Table No. MJV-16; Panel C, [6].

[8]: {Combined Rate - (Combined Rate - [13])} / 6.

[9]: {[8] - (Combined Rate - [13])} / 6.

[10]: {[9] - (Combined Rate - [13])} / 6.

[11]: {[10] - (Combined Rate - [13])} / 6.

[12]: {[11] - (Combined Rate - [13])} / 6.

[13]: Blue Chip Economic Indicators, March 10, 2005, page 15. This number is assumed to be the perpetual growth rate.

[14]: Workpaper #3 to Table No. MJV-17.

Workpaper #1 to Table No. MJV-17

2004 Gas LDC Sample

Common Stock Prices from March 11, 2005 to April 1, 2005

Company	01-Apr-05	31-Mar-05	30-Mar-05	29-Mar-05	28-Mar-05	25-Mar-05	24-Mar-05	23-Mar-05	22-Mar-05	21-Mar-05	18-Mar-05	17-Mar-05	16-Mar-05	15-Mar-05	14-Mar-05	11-Mar-05	Average
Cascade Natural Gas Corp	$19.70	$19.96	$20.22	$19.81	$20.09	-	$20.36	$20.11	$20.27	$20.40	$20.38	$20.43	$20.24	$20.50	$20.50	$20.44	$20.23
Keyspan Corp	$38.98	$38.97	$38.68	$38.35	$38.68	-	$38.52	$38.36	$38.57	$39.38	$39.55	$39.84	$39.67	$39.97	$39.99	$39.30	$39.12
Laclede Group Inc	$28.92	$29.20	$29.63	$29.00	$29.95	-	$29.60	$29.40	$29.75	$29.96	$30.18	$29.99	$30.13	$30.32	$30.76	$30.20	$29.80
Northwest Natural Gas Co	$35.94	$36.17	$35.93	$35.46	$35.61	-	$35.33	$35.07	$35.75	$36.20	$36.30	$36.04	$35.83	$36.15	$36.28	$35.90	$35.86
Peoples Energy Corp	$41.94	$41.92	$41.81	$41.18	$41.68	-	$41.63	$41.62	$41.84	$42.96	$43.28	$44.30	$44.10	$44.20	$44.64	$43.75	$42.72
South Jersey Industries Inc	$56.80	$56.40	$56.23	$55.45	$55.24	-	$55.04	$54.48	$55.36	$55.98	$56.80	$56.80	$56.98	$57.01	$57.68	$56.70	$56.20
Southwest Gas Corp	$24.54	$24.16	$24.40	$23.70	$24.02	-	$23.96	$24.10	$24.34	$24.68	$24.81	$25.01	$25.03	$25.19	$25.18	$25.10	$24.55
Wgl Holdings Inc	$30.93	$30.96	$30.62	$30.13	$30.75	-	$30.66	$30.68	$31.11	$31.58	$31.67	$31.71	$31.55	$31.67	$31.55	$31.28	$31.12

Sources and Notes:
Compustat as of April 2005.
The prices chosen are the daily closing prices from Compustat starting from I/B/E/S forecast date and ending fifteen trading days before.

Workpaper #2 to Table No. MJV-17

2004 Gas LDC Sample

1st Quarter 2005 Dividend Payments

Company	Q1, 2005
Cascade Natural Gas Corp	$0.24
Keyspan Corp	$0.45
Laclede Group Inc	$0.34
Northwest Natural Gas Co	$0.32
Peoples Energy Corp	$0.55
South Jersey Industries Inc	$0.43
Southwest Gas Corp	$0.20
Wgl Holdings Inc	$0.32

Sources and Notes:
Compustat as of April 2005.

Workpaper #3 to Table No. MJV-17

DCF Cost of Equity of the 2004 Gas LDC Sample

Multi - Stage DCF (using the Blue Chip Indicators Long-Term GDP Growth Rate Forecast as the Perpetual Growth Rate)

Year	Company	Cascade Natural Gas Corp	Keyspan Corp	Laclede Group Inc	Northwest Natural Gas Co	Peoples Energy Corp	South Jersey Industries Inc	Southwest Gas Corp	Wgl Holdings Inc
	Current Stock Price	($20.23)	($39.12)	($29.80)	($35.86)	($42.72)	($56.20)	($24.55)	($31.12)
YEAR 2005	Dividend Q2 Estimate	$0.24	$0.44	$0.35	$0.34	$0.56	$0.43	$0.21	$0.33
YEAR 2005	Dividend Q3 Estimate	$0.24	$0.42	$0.35	$0.35	$0.57	$0.44	$0.21	$0.33
YEAR 2005	Dividend Q4 Estimate	$0.23	$0.41	$0.35	$0.36	$0.59	$0.44	$0.21	$0.33
YEAR 2006	Dividend Q1 Estimate	$0.24	$0.41	$0.35	$0.36	$0.59	$0.45	$0.21	$0.33
YEAR 2006	Dividend Q2 Estimate	$0.24	$0.42	$0.36	$0.37	$0.60	$0.45	$0.22	$0.33
YEAR 2006	Dividend Q3 Estimate	$0.25	$0.42	$0.36	$0.37	$0.60	$0.45	$0.23	$0.34
YEAR 2006	Dividend Q4 Estimate	$0.25	$0.43	$0.37	$0.38	$0.61	$0.46	$0.23	$0.34
YEAR 2007	Dividend Q1 Estimate	$0.26	$0.43	$0.37	$0.38	$0.61	$0.47	$0.23	$0.34
YEAR 2007	Dividend Q2 Estimate	$0.26	$0.44	$0.37	$0.39	$0.62	$0.47	$0.24	$0.35
YEAR 2007	Dividend Q3 Estimate	$0.27	$0.44	$0.38	$0.39	$0.62	$0.48	$0.24	$0.35
YEAR 2007	Dividend Q4 Estimate	$0.27	$0.45	$0.38	$0.39	$0.63	$0.48	$0.24	$0.35
YEAR 2008	Dividend Q1 Estimate	$0.28	$0.46	$0.39	$0.39	$0.63	$0.49	$0.24	$0.36
YEAR 2008	Dividend Q2 Estimate	$0.28	$0.48	$0.39	$0.40	$0.64	$0.50	$0.25	$0.36
YEAR 2008	Dividend Q3 Estimate	$0.29	$0.49	$0.40	$0.40	$0.64	$0.50	$0.25	$0.37
YEAR 2008	Dividend Q4 Estimate	$0.29	$0.51	$0.40	$0.40	$0.65	$0.51	$0.26	$0.37
YEAR 2009	Dividend Q1 Estimate	$0.29	$0.53	$0.41	$0.41	$0.66	$0.52	$0.27	$0.38
YEAR 2009	Dividend Q2 Estimate	$0.30	$0.54	$0.41	$0.41	$0.66	$0.52	$0.27	$0.39
YEAR 2009	Dividend Q3 Estimate	$0.30	$0.56	$0.42	$0.41	$0.67	$0.53	$0.28	$0.39
YEAR 2009	Dividend Q4 Estimate	$0.31	$0.58	$0.42	$0.41	$0.67	$0.54	$0.29	$0.40
YEAR 2010	Dividend Q1 Estimate	$0.31	$0.58	$0.43	$0.42	$0.68	$0.54	$0.29	$0.40
YEAR 2010	Dividend Q2 Estimate	$0.32	$0.59	$0.43	$0.43	$0.69	$0.55	$0.30	$0.41
YEAR 2010	Dividend Q3 Estimate	$0.32	$0.60	$0.44	$0.43	$0.69	$0.56	$0.30	$0.41
YEAR 2010	Dividend Q4 Estimate	$0.33	$0.61	$0.44	$0.44	$0.70	$0.56	$0.31	$0.42
YEAR 2011	Dividend Q1 Estimate	$0.33	$0.61	$0.45	$0.44	$0.71	$0.57	$0.31	$0.42
YEAR 2011	Dividend Q2 Estimate	$0.34	$0.62	$0.45	$0.45	$0.72	$0.58	$0.32	$0.43
YEAR 2011	Dividend Q3 Estimate	$0.34	$0.63	$0.46	$0.45	$0.72	$0.59	$0.32	$0.43
YEAR 2011	Dividend Q4 Estimate	$0.35	$0.64	$0.46	$0.46	$0.73	$0.59	$0.32	$0.44
YEAR 2012	Dividend Q1 Estimate	$0.35	$0.65	$0.47	$0.46	$0.74	$0.60	$0.33	$0.44
YEAR 2012	Dividend Q2 Estimate	$0.36	$0.65	$0.48	$0.47	$0.75	$0.61	$0.33	$0.45
YEAR 2012	Dividend Q3 Estimate	$0.36	$0.66	$0.48	$0.48	$0.76	$0.62	$0.34	$0.45
YEAR 2012	Dividend Q4 Estimate	$0.37	$0.67	$0.49	$0.48	$0.77	$0.63	$0.34	$0.46
YEAR 2013	Dividend Q1 Estimate	$0.37	$0.68	$0.49	$0.49	$0.78	$0.63	$0.35	$0.46
YEAR 2013	Dividend Q2 Estimate	$0.38	$0.69	$0.50	$0.49	$0.78	$0.64	$0.35	$0.47
YEAR 2013	Dividend Q3 Estimate	$0.38	$0.70	$0.51	$0.50	$0.79	$0.65	$0.36	$0.48
YEAR 2013	Dividend Q4 Estimate	$0.39	$0.71	$0.51	$0.51	$0.80	$0.66	$0.36	$0.48
YEAR 2014	Dividend Q1 Estimate	$0.39	$0.71	$0.52	$0.51	$0.81	$0.67	$0.37	$0.49
YEAR 2014	Dividend Q2 Estimate	$0.40	$0.72	$0.52	$0.52	$0.82	$0.68	$0.37	$0.49
YEAR 2014	Dividend Q3 Estimate	$0.40	$0.73	$0.53	$0.53	$0.83	$0.68	$0.38	$0.50
YEAR 2014	Dividend Q4 Estimate	$0.41	$0.74	$0.54	$0.53	$0.84	$0.69	$0.38	$0.51
YEAR 2015	Dividend Q1 Estimate	$0.41	$0.75	$0.55	$0.54	$0.86	$0.70	$0.39	$0.51
YEAR 2015	Dividend Q2 Estimate	$0.42	$0.76	$0.55	$0.55	$0.87	$0.71	$0.39	$0.52
YEAR 2015 Q2	Year 10 Stock Price	$35.21	$68.62	$51.06	$61.33	$72.46	$96.76	$43.04	$53.46
	Trial COE - Quarterly Rate	2.5%	2.4%	2.4%	2.2%	2.5%	2.0%	2.2%	2.3%
	Trial COE - Annual Rate	10.4%	10.1%	9.9%	9.1%	10.4%	8.4%	9.2%	9.5%
	Cost of Equity	10.4%	10.1%	9.9%	9.1%	10.4%	8.4%	9.2%	9.5%
	(Trial COE - COE) x 100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Sources and Notes:

All Growth Rate Estimates: Table No. MJV-17; Panel B.

Stock Prices and Dividends are from Compustat as of April 2005.

1. See Workpaper #1 to Table No. MJV-17 for the average closing stock price obtained from Compustat.
2. See Workpaper #2 to Table No. MJV-17 for the for the quarterly dividend obtained from Compustat.
3. The Blue Chip Long-Term GDP Growth Rate is used to calculate the Year 10 Stock Price.

{(the Dividend Year 2015 Q2 Estimate) x ((1 + the Perpetual Growth Rate) ^ (1/4))} /

{(Trial COE - Quarterly Rate) - ((1 + the Perpetual Growth Rate) ^ (1/4) -1)}.

Table No. MJV-18

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel A: Simple DCF Method (Quarterly)

Company		1st Quarter, 2005 Bond Rating [1]	1st Quarter, 2005 Preferred Equity Rating [2]	DCF Cost of Equity [3]	DCF Common Equity to Market Value Ratio [4]	Cost of Preferred Equity [5]	DCF Preferred Equity to Market Value Ratio [6]	Cost of Debt [7]	DCF Debt to Market Value Ratio [8]	Arizona-American Water Company's Income Tax Rate [9]	Overall After- Tax Cost of Capital [10]
Cascade Natural Gas Corp	*	Baa	n/a	11.0%	0.59	n/a	-	5.8%	0.41	39.5%	7.9%
Keyspan Corp		A	Baa	10.0%	0.59	6.4%	0.00	5.6%	0.41	39.5%	7.3%
Laclede Group Inc	*	Baa	Ba	9.3%	0.61	6.4%	0.00	5.8%	0.39	39.5%	7.0%
Northwest Natural Gas Co	*	A	n/a	8.9%	0.66	n/a	-	5.6%	0.34	39.5%	7.0%
Peoples Energy Corp		A	n/a	9.4%	0.64	n/a	-	5.6%	0.36	39.5%	7.3%
South Jersey Industries Inc	*	Baa	Baa	8.4%	0.70	6.4%	0.00	5.8%	0.30	39.5%	6.9%
Southwest Gas Corp	*	Baa	n/a	10.3%	0.41	n/a	-	5.8%	0.59	39.5%	6.3%
Wgl Holdings Inc		A	Baa	9.1%	0.70	6.4%	0.01	5.6%	0.29	39.5%	7.4%
Average [a]				9.6%	0.61	6.4%	0.00	5.7%	0.39	39.5%	7.1%
Average [b]				9.6%	0.59	6.4%	0.00	5.7%	0.41	39.5%	7.0%

Sources and Notes:

[1] - [2]: www.moodys.com as of April 2005.
South Jersey Industries Inc's preferred equity rating is assumed equal to its debt rating.

[3]: Table No. MJV-17; Panel A, [6].

[4]: Table No. MJV-15, [1].

[5]: Mergent Bond Record, March 2005.

[6]: Table No. MJV-15, [2].

[7]: Mergent Bond Record, March 2005.

[8]: Table No. MJV-15, [3].

[9]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}.

[a]: Average over all companies.

[b]: Average for companies marked with an asterisk.

* Companies marked with an asterisk represent the companies with 2004 revenues from regulated activities greater than 70%.

Table No. MJV-18

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel B: Multi-Stage DCF (Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company		1st Quarter, 2005 Bond Rating [1]	1st Quarter, 2005 Preferred Equity Rating [2]	DCF Cost of Equity [3]	DCF Common Equity to Market Value Ratio [4]	Cost of Preferred Equity [5]	DCF Preferred Equity to Market Value Ratio [6]	Cost of Debt [7]	DCF Debt to Market Value Ratio [8]	Arizona-American Water Company's Income Tax Rate [9]	Overall After- Tax Cost of Capital [10]
Cascade Natural Gas Corp	*	Baa	n/a	10.4%	0.59	n/a	-	5.8%	0.41	39.5%	7.5%
Keyspan Corp		A	Baa	10.1%	0.59	6.4%	0.00	5.6%	0.41	39.5%	7.3%
Laclede Group Inc	*	Baa	Ba	9.9%	0.61	6.4%	0.00	5.8%	0.39	39.5%	7.4%
Northwest Natural Gas Co	*	A	n/a	9.1%	0.66	n/a	-	5.6%	0.34	39.5%	7.2%
Peoples Energy Corp		A	n/a	10.4%	0.64	n/a	-	5.6%	0.36	39.5%	7.9%
South Jersey Industries Inc	*	Baa	Baa	8.4%	0.70	6.4%	0.00	5.8%	0.30	39.5%	6.9%
Southwest Gas Corp	*	Baa	n/a	9.2%	0.41	n/a	-	5.8%	0.59	39.5%	5.8%
Wgl Holdings Inc		A	Baa	9.5%	0.70	6.4%	0.01	5.6%	0.29	39.5%	7.7%
Average [a]				9.6%	0.61	6.4%	0.00	5.7%	0.39	39.5%	7.2%
Average [b]				9.4%	0.59	6.4%	0.00	5.7%	0.41	39.5%	7.0%

Sources and Notes:

[1] - [2]: www.moodys.com as of April 2005.
South Jersey Industries Inc's preferred equity rating is assumed equal to its debt rating.
[3]: Table No. MJV-17; Panel B, [14].
[4]: Table No. MJV-15, [1].
[5]: Mergent Bond Record, March 2005.
[6]: Table No. MJV-15, [2].
[7]: Mergent Bond Record, March 2005.
[8]: Table No. MJV-15, [3].

[9]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}.
[a]: Average over all companies.
[b]: Average for companies marked with an asterisk.
* Companies marked with an asterisk represent the companies
with 2004 revenues from regulated activities greater than 70%.

Table No. MJV-19

DCF Cost of Equity at Paradise Valley Water Company's Capital Structure

2004 Gas LDC Sample Return on Equity

	Overall Cost of Capital [1]	Paradise Valley Water Company's Regulatory % Debt [2]	Paradise Valley Water Company's Cost of Debt [3]	Arizona-American Water Company's Income Tax [4]	Paradise Valley Water Company's Regulatory % Equity [5]	Estimated Return on Equity [6]
Using All Companies						
Simple DCF Quarterly	7.1%	0.63	5.6%	39.5%	0.37	13.6%
Multi-Stage DCF - Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate	7.2%	0.63	5.6%	39.5%	0.37	13.8%
Using Companies that have 2004 revenues from regulated activities greater than 70%.						
Simple DCF Quarterly	7.0%	0.63	5.6%	39.5%	0.37	13.3%
Multi-Stage DCF - Using the Blue-Chip Long-Term GDP Growth Forecast as the Perpetual Rate	7.0%	0.63	5.6%	39.5%	0.37	13.1%

Sources and Notes:
[1]: Table No. MJV-18; Panels A-B, [10].
[2]: Paradise Valley Water Company.
[3]: Mergent Bond Record, March 2005. Based on an A rating.
[4]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[5]: Paradise Valley Water Company.
[6]: {[1] - [2] x [3] x (1 - [4])} / [5].

Table No. MJV-20

Risk Positioning Cost of Equity of the 2004 Gas LDC Sample

Panel A: Using Unadjusted ValueLine Betas and the Long-Term Risk-Free Rate

Company		Long-Term Risk-Free Rate [1]	Unadjusted ValueLine Beta on Market [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (0.5%) Cost of Equity [5]	ECAPM (1.5%) Cost of Equity [6]
Cascade Natural Gas Corp	*	5.0%	0.60	6.5%	8.9%	9.1%	9.5%
Keyspan Corp		5.0%	0.67	6.5%	9.4%	9.5%	9.9%
Laclede Group Inc	*	5.0%	0.60	6.5%	8.9%	9.1%	9.5%
Northwest Natural Gas Co	*	5.0%	0.45	6.5%	7.9%	8.2%	8.7%
Peoples Energy Corp	*	5.0%	0.67	6.5%	9.4%	9.5%	9.9%
South Jersey Industries Inc	*	5.0%	0.30	6.5%	6.9%	7.3%	8.0%
Southwest Gas Corp	*	5.0%	0.60	6.5%	8.9%	9.1%	9.5%
Wgl Holdings Inc		5.0%	0.60	6.5%	8.9%	9.1%	9.5%
Average [a]		5.0%	0.56	6.5%	8.6%	8.9%	9.3%
Average [b]		5.0%	0.53	6.5%	8.5%	8.7%	9.2%

Sources and Notes:
[1]: Table No. MJV - 12; Panel A.
[2]: Workpaper # 1 to Table No. MJV-20.
[3]: MJV Testimony, Appendix B.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 0.5%) + [2] x ([3] - 0.5%).
[6]: ([1] + 1.5%) + [2] x ([3] - 1.5%).
[a]: Average over all companies.
[b]: Average for companies marked with an asterisk.
* Companies marked with an asterisk represent the companies with 5-year average revenues from regulated activities greater than 70%.

Table No. MJV-20

Risk Positioning Cost of Equity of the 2004 Gas LDC Sample

Panel B: Using Unadjusted ValueLine Betas and the Short-Term Risk-Free Rate

Company		Short-Term Risk-Free Rate [1]	Unadjusted ValueLine Beta on Market [2]	Short-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1%) Cost of Equity [5]	ECAPM (2%) Cost of Equity [6]	ECAPM (3%) Cost of Equity [7]
Cascade Natural Gas Corp	*	3.0%	0.60	8.0%	7.8%	8.2%	8.6%	9.0%
Keyspan Corp		3.0%	0.67	8.0%	8.4%	8.7%	9.0%	9.4%
Laclede Group Inc	*	3.0%	0.60	8.0%	7.8%	8.2%	8.6%	9.0%
Northwest Natural Gas Co	*	3.0%	0.45	8.0%	6.6%	7.1%	7.7%	8.2%
Peoples Energy Corp	*	3.0%	0.67	8.0%	8.4%	8.7%	9.0%	9.4%
South Jersey Industries Inc	*	3.0%	0.30	8.0%	5.4%	6.1%	6.8%	7.5%
Southwest Gas Corp	*	3.0%	0.60	8.0%	7.8%	8.2%	8.6%	9.0%
Wgl Holdings Inc		3.0%	0.60	8.0%	7.8%	8.2%	8.6%	9.0%
Average [a]		3.0%	0.56	8.0%	7.5%	7.9%	8.4%	8.8%
Average [b]		3.0%	0.58	8.0%	7.7%	8.1%	8.5%	8.9%

Sources and Notes:
[1]: Table No. MJV - 12; Panel A.
[2]: Workpaper # 1 to Table No. MJV-20.
[3]: MJV Testimony, Appendix B.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1%) + [2] x ([3] - 1%).
[6]: ([1] + 2%) + [2] x ([3] - 2%).
[7]: ([1] + 3%) + [2] x ([3] - 3%).
[a]: Average over all companies.
[b]: Average for companies whose short-term CAPM cost of equity exceeds their cost of debt plus 25 basis points and that have an asterix.

* *Companies marked with an asterisk represent the companies*
with 5-year average revenues from regulated activities greater than 70%.

Workpaper # 1 to Table No. MJV-20

2004 Gas LDC Sample

ValueLine Betas

Company	Beta as of March 18, 2005 [1]	Unadjusted Beta [2]	Beta as of December 19, 2003 [3]
Cascade Natural Gas Corp	0.75	0.60	0.70
Keyspan Corp	0.80	0.67	0.75
Laclede Group Inc	0.75	0.60	0.70
Northwest Natural Gas Co	0.65	0.45	0.60
Peoples Energy Corp	0.80	0.67	0.75
South Jersey Industries Inc	0.55	0.30	0.55
Southwest Gas Corp	0.75	0.60	0.75
Wgl Holdings Inc	0.75	0.60	0.70

Sources and Notes:
[1]: Value Line beta, as of March 18, 2005.
[2]: The reported beta in [1] by Value Line is unadjusted using the formula: ([1] - .35) / .67.
[3]: Value Line beta as of December 19, 2003.

Workpaper # 2 to Table No. MJV-20

2004 Gas LDC Sample

52-Week Regression Statistics for Week Ending on 4/13/2005

Company	Cascade Natural Gas Corp	Keyspan Corp	Laclede Group Inc	Northwest Natural Gas Co	Peoples Energy Corp	South Jersey Industries Inc	Southwest Gas Corp	Wgl Holdings Inc	Average	Gas Ldc Portfolio
Beta	0.84	0.84	1.16	1.05	1.05	1.13	0.90	1.01	**1.00**	1.00
St. Dev	0.26	0.18	0.21	0.16	0.17	0.21	0.18	0.17	**0.19**	0.13
T-Stat	3.24	4.75	5.38	6.36	6.33	5.48	4.98	5.81	**5.17**	7.61

Sources and Notes:
Compustat as of April 2005.
Risk-free rate taken from the St. Louis Federal Reserve Bank.
Regression in Question:
(Company Returns - Risk-Free Rate) = Intercept + Beta (S&P 500 Returns - Risk-Free Rate).
Weekly data set is constructed using closing prices as of Wednesday, if available. If not available, Tuesday's closing price was taken.
The week including September 11, 2001 was excluded from this analysis.

Table No. MJV-21

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel A: CAPM Cost of Equity Based on Unadjusted ValueLine Betas and a Long-Term Risk-Free Rate

Company		CAPM Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-American Water Company's Income Tax Rate [7]	Overall After- Tax Cost o Capital [8]
Cascade Natural Gas Corp	*	8.9%	0.60	n/a	-	5.8%	0.40	39.5%	6.7%
Keyspan Corp		9.4%	0.52	6.3%	0.01	5.6%	0.47	39.5%	6.5%
Laclede Group Inc	*	8.9%	0.60	6.3%	0.00	5.7%	0.39	39.5%	6.7%
Northwest Natural Gas Co	*	7.9%	0.60	6.4%	0.01	5.6%	0.38	39.5%	6.2%
Peoples Energy Corp	*	9.4%	0.63	n/a	-	5.6%	0.37	39.5%	7.2%
South Jersey Industries Inc	*	6.9%	0.57	6.4%	0.00	5.8%	0.43	39.5%	5.5%
Southwest Gas Corp	*	8.9%	0.40	n/a	-	5.8%	0.60	39.5%	5.6%
Wgl Holdings Inc		8.9%	0.67	6.3%	0.01	5.6%	0.31	39.5%	7.1%
Average [a]		8.6%	0.57	6.3%	0.00	5.7%	0.42	39.5%	6.4%
Average [b		8.5%	0.57	6.3%	0.00	5.7%	0.43	39.5%	6.3%

Sources and Notes:

[1]: Table No. MJV-20; Panel A, [4].

[2]: Table No. MJV-15, [4].

[3]: Workpaper #2 to Table No. MJV-21 ; Panel B, [10].

[4]: Table No. MJV-15, [5].

[5]: Workpaper #2 to Table No. MJV-21 ; Panel A, [8].

[6]: Table No. MJV-15, [6].

[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.

[b]: Average for companies marked with an asterisk.

* Companies marked with an asterisk represent the companies
with 5-year average revenues from regulated activities greater than 70%.

Table No. MJV-21

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel B: ECAPM (0.5%) Cost of Equity Based on Unadjusted ValueLine Betas and a Long-Term Risk-Free Rate

Company		ECAPM (0.5%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-American Water Company's Income Tax Rate [7]	Overall After- Tax Cost o Capital [8]
Cascade Natural Gas Corp	*	9.1%	0.60	n/a	-	5.8%	0.40	39.5%	6.8%
Keyspan Corp		9.5%	0.52	6.3%	0.01	5.6%	0.47	39.5%	6.6%
Laclede Group Inc	*	9.1%	0.60	6.3%	0.00	5.7%	0.39	39.5%	6.9%
Northwest Natural Gas Co	*	8.2%	0.60	6.4%	0.01	5.6%	0.38	39.5%	6.3%
Peoples Energy Corp	*	9.5%	0.63	n/a	-	5.6%	0.37	39.5%	7.3%
South Jersey Industries Inc	*	7.3%	0.57	6.4%	0.00	5.8%	0.43	39.5%	5.7%
Southwest Gas Corp	*	9.1%	0.40	n/a	-	5.8%	0.60	39.5%	5.7%
Wgl Holdings Inc		9.1%	0.67	6.3%	0.01	5.6%	0.31	39.5%	7.3%
Average [a]		8.9%	0.57	6.3%	0.00	5.7%	0.42	39.5%	6.6%
Average [b]		8.7%	0.57	6.3%	0.00	5.7%	0.43	39.5%	6.4%

Sources and Notes:
[1]: Table No. MJV-20; Panel A, [5].
[2]: Table No. MJV-15, [4].
[3]: Workpaper #2 to Table No. MJV-21 ; Panel B, [10].
[4]: Table No. MJV-15, [5].
[5]: Workpaper #2 to Table No. MJV-21 ; Panel A, [8].
[6]: Table No. MJV-15, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average for companies marked with an asterisk.
* Companies marked with an asterisk represent the companies
with 5-year average revenues from regulated activities greater than 70%.

Table No. MJV-21

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel C: ECAPM (1.5%) Cost of Equity Based on Unadjusted ValueLine Betas and a Long-Term Risk-Free Rate

Company		ECAPM (1.5%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-American Water Company's Income Tax Rate [7]	Overall After- Tax Cost o Capital [8]
Cascade Natural Gas Corp	*	9.5%	0.60	n/a	-	5.8%	0.40	39.5%	7.1%
Keyspan Corp		9.9%	0.52	6.3%	0.01	5.6%	0.47	39.5%	6.8%
Laclede Group Inc	*	9.5%	0.60	6.3%	0.00	5.7%	0.39	39.5%	7.1%
Northwest Natural Gas Co	*	8.7%	0.60	6.4%	0.01	5.6%	0.38	39.5%	6.7%
Peoples Energy Corp	*	9.9%	0.63	n/a	-	5.6%	0.37	39.5%	7.5%
South Jersey Industries Inc	*	8.0%	0.57	6.4%	0.00	5.8%	0.43	39.5%	6.1%
Southwest Gas Corp	*	9.5%	0.40	n/a	-	5.8%	0.60	39.5%	5.9%
Wgl Holdings Inc		9.5%	0.67	6.3%	0.01	5.6%	0.31	39.5%	7.5%
Average [a]		9.3%	0.57	6.3%	0.00	5.7%	0.42	39.5%	6.8%
Average [b]		9.2%	0.57	6.3%	0.00	5.7%	0.43	39.5%	6.7%

Sources and Notes:

[1]: Table No. MJV-20; Panel A, [6].
[2]: Table No. MJV-15, [4].
[3]: Workpaper #2 to Table No. MJV-21 ; Panel B, [10].
[4]: Table No. MJV-15, [5].
[5]: Workpaper #2 to Table No. MJV-21 ; Panel A, [8].
[6]: Table No. MJV-15, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average for companies marked with an asterisk.
* Companies marked with an asterisk represent the companies
with *5-year average revenues from regulated activities greater than 70%.*

Table No. MJV-21

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel D: CAPM Cost of Equity Based on Unadjusted ValueLine Betas and a Short-Term Risk-Free Rate

Company		CAPM Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-American Water Company's Income Tax Rate [7]	Overall After- Tax Cost o Capital [8]
Cascade Natural Gas Corp	*	7.8%	0.60	n/a	-	5.8%	0.40	39.5%	6.1%
Keyspan Corp		8.4%	0.52	6.3%	0.01	5.6%	0.47	39.5%	6.0%
Laclede Group Inc	*	7.8%	0.60	6.3%	0.00	5.7%	0.39	39.5%	6.1%
Northwest Natural Gas Co	*	6.6%	0.60	6.4%	0.01	5.6%	0.38	39.5%	5.4%
Peoples Energy Corp	*	8.4%	0.63	n/a	-	5.6%	0.37	39.5%	6.5%
South Jersey Industries Inc	*	5.4%	0.57	6.4%	0.00	5.8%	0.43	39.5%	4.6%
Southwest Gas Corp	*	7.8%	0.40	n/a	-	5.8%	0.60	39.5%	5.2%
Wgl Holdings Inc		7.8%	0.67	6.3%	0.01	5.6%	0.31	39.5%	6.4%
Average [a]		7.5%	0.57	6.3%	0.00	5.7%	0.42	39.5%	5.8%
Average [b]		7.7%	0.57	6.3%	0.00	5.7%	0.43	39.5%	5.8%

Sources and Notes:
[1]: Table No. MJV-20; Panel B, [4].
[2]: Table No. MJV-15, [4].
[3]: Workpaper #2 to Table No. MJV-21 ; Panel B, [10].
[4]: Table No. MJV-15, [5].
[5]: Workpaper #2 to Table No. MJV-21 ; Panel A, [8].
[6]: Table No. MJV-15, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average for companies whose short-term CAPM cost of equity exceeds their cost of debt plus 25 basis p

* Companies marked with an asterisk represent the companies
with 5-year average revenues from regulated activities greater than 70%.

Table No. MJV-21

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel E: ECAPM (1%) Cost of Equity Based on Unadjusted ValueLine Betas and a Short-Term Risk-Free Rate

Company		ECAPM (1%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-American Water Company's Income Tax Rate [7]	Overall After- Tax Cost o Capital [8]
Cascade Natural Gas Corp	*	8.2%	0.60	n/a	-	5.8%	0.40	39.5%	6.3%
Keyspan Corp		8.7%	0.52	6.3%	0.01	5.6%	0.47	39.5%	6.2%
Laclede Group Inc	*	8.2%	0.60	6.3%	0.00	5.7%	0.39	39.5%	6.3%
Northwest Natural Gas Co	*	7.1%	0.60	6.4%	0.01	5.6%	0.38	39.5%	5.7%
Peoples Energy Corp	*	8.7%	0.63	n/a	-	5.6%	0.37	39.5%	6.7%
South Jersey Industries Inc	*	6.1%	0.57	6.4%	0.00	5.8%	0.43	39.5%	5.0%
Southwest Gas Corp	*	8.2%	0.40	n/a	-	5.8%	0.60	39.5%	5.3%
Wgl Holdings Inc		8.2%	0.67	6.3%	0.01	5.6%	0.31	39.5%	6.6%
Average [a]		7.9%	0.57	6.3%	0.00	5.7%	0.42	39.5%	6.0%
Average [b]		8.1%	0.57	6.3%	0.00	5.7%	0.43	39.5%	6.1%

Sources and Notes:
[1]: Table No. MJV-20; Panel B, [5].
[2]: Table No. MJV-15, [4].
[3]: Workpaper #2 to Table No. MJV-21 ; Panel B, [10].
[4]: Table No. MJV-15, [5].
[5]: Workpaper #2 to Table No. MJV-21 ; Panel A, [8].
[6]: Table No. MJV-15, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average for companies whose short-term CAPM cost of equity exceeds their cost of debt plus 25 basis p

* Companies marked with an asterisk represent the companies
with 5-year average revenues from regulated activities greater than 70%.

Table No. MJV-21

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel F: ECAPM (2%) Cost of Equity Based on Unadjusted ValueLine Betas and a Short-Term Risk-Free Rate

Company		ECAPM (2%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-American Water Company's Income Tax Rate [7]	Overall After- Tax Cost o Capital [8]
Cascade Natural Gas Corp	*	8.6%	0.60	n/a	-	5.8%	0.40	39.5%	6.5%
Keyspan Corp		9.0%	0.52	6.3%	0.01	5.6%	0.47	39.5%	6.3%
Laclede Group Inc	*	8.6%.	0.60	6.3%	0.00	5.7%	0.39	39.5%	6.6%
Northwest Natural Gas Co	*	7.7%	0.60	6.4%	0.01	5.6%	0.38	39.5%	6.0%
Peoples Energy Corp	*	9.0%	0.63	n/a	-	5.6%	0.37	39.5%	7.0%
South Jersey Industries Inc	*	6.8%	0.57	6.4%	0.00	5.8%	0.43	39.5%	5.4%
Southwest Gas Corp	*	8.6%	0.40	n/a	-	5.8%	0.60	39.5%	5.5%
Wgl Holdings Inc		8.6%	0.67	6.3%	0.01	5.6%	0.31	39.5%	6.9%
Average [a]		8.4%	0.57	6.3%	0.00	5.7%	0.42	39.5%	6.3%
Average [b]		8.5%	0.57	6.3%	0.00	5.7%	0.43	39.5%	6.3%

Sources and Notes:
[1]: Table No. MJV-20; Panel B, [6].
[2]: Table No. MJV-15, [4].
[3]: Workpaper #2 to Table No. MJV-21 ; Panel B, [10].
[4]: Table No. MJV-15, [5].
[5]: Workpaper #2 to Table No. MJV-21 ; Panel A, [8].
[6]: Table No. MJV-15, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average for companies whose short-term CAPM cost of equity exceeds their cost of debt plus 25 basis p

* *Companies marked with an asterisk represent the companies* with 5-year average revenues from regulated activities greater than 70%.

Table No. MJV-21

Overall Cost of Capital of the 2004 Gas LDC Sample

Panel G: ECAPM (3%) Cost of Equity Based on Unadjusted ValueLine Betas and a Short-Term Risk-Free Rate

Company		ECAPM (3%) Cost of Equity [1]	5-Year Average Common Equity to Market Value Ratio [2]	Weighted - Average Cost of Preferred Equity [3]	5-Year Average Preferred Equity to Market Value Ratio [4]	Weighted - Average Cost of Debt [5]	5-Year Average Debt to Market Value Ratio [6]	Arizona-American Water Company's Income Tax Rate [7]	Overall After- Tax Cost o Capital [8]
Cascade Natural Gas Corp	*	9.0%	0.60	n/a	-	5.8%	0.40	39.5%	6.8%
Keyspan Corp		9.4%	0.52	6.3%	0.01	5.6%	0.47	39.5%	6.5%
Laclede Group Inc	*	9.0%	0.60	6.3%	0.00	5.7%	0.39	39.5%	6.8%
Northwest Natural Gas Co	*	8.2%	0.60	6.4%	0.01	5.6%	0.38	39.5%	6.4%
Peoples Energy Corp	*	9.4%	0.63	n/a	-	5.6%	0.37	39.5%	7.2%
South Jersey Industries Inc	*	7.5%	0.57	6.4%	0.00	5.8%	0.43	39.5%	5.8%
Southwest Gas Corp	*	9.0%	0.40	n/a	-	5.8%	0.60	39.5%	5.7%
Wgl Holdings Inc		9.0%	0.67	6.3%	0.01	5.6%	0.31	39.5%	7.2%
Average [a]		8.8%	0.57	6.3%	0.00	5.7%	0.42	39.5%	6.5%
Average [b]		8.9%	0.57	6.3%	0.00	5.7%	0.43	39.5%	6.6%

Sources and Notes:
[1]: Table No. MJV-20; Panel B, [7].
[2]: Table No. MJV-15, [4].
[3]: Workpaper #2 to Table No. MJV-21 ; Panel B, [10].
[4]: Table No. MJV-15, [5].
[5]: Workpaper #2 to Table No. MJV-21 ; Panel A, [8].
[6]: Table No. MJV-15, [6].
[7]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[8]: ([1] x [2]) + ([3] x [4]) + {[5] x [6] x (1 - [7])}.

[a]: Average over all companies.
[b]: Average for companies whose short-term CAPM cost of equity exceeds their cost of debt plus 25 basis p

* Companies marked with an asterisk represent the companies
with 5-year average revenues from regulated activities greater than 70%.

Workpaper #1 to Table No. MJV-21

2004 Gas LDC Sample

Panel A: Bond Rating Summary from 2000 to 2004

						Days of Rating			
Company	Year-End 2004	Year-End 2003	Year-End 2002	Year-End 2001	Year-End 2000	Aa	A	Baa	Total Days
Cascade Natural Gas Corp	Baa	Baa	Baa	Baa	Baa	0	0	1827	1827
Keyspan Corp	A	A	A	A	A	0	1827	0	1827
Laclede Group Inc	Baa	Baa	Baa	A	A	0	948	879	1827
Northwest Natural Gas Co	A	A	A	A	A	0	1827	0	1827
Peoples Energy Corp	A	A	A	A	A	0	1827	0	1827
South Jersey Industries Inc	Baa	Baa	Baa	Baa	Baa	0	0	1827	1827
Southwest Gas Corp	Baa	Baa	Baa	Baa	Baa	0	0	1827	1827
Wgl Holdings Inc	A	A	A	Aa	Aa	1077	750	0	1827

Sources and Notes:
Ratings from Moody's (www.moodys.com).
The ratings for Cascade Natural Gas Corp, Northwest Natural Gas Co, Peoples Energy Corp, South Jersey Industries Inc, Southwest Gas Corp and WGL Holdings are for senior unsecured securities.
The ratings for Keyspan Corp are LT Issuer ratings and for Laclede Group Inc are senior unsecured shelf.
The ratings for Laclede Group Inc are for Laclede Gas Company.
The ratings for WGL Holdings Inc. are for its subsidiary Washington Gas and Light Company.

Workpaper #1 to Table No. MJV-21

2004 Gas LDC Sample

Panel B: Preferred Equity Rating Summary from 2000 to 2004

						Days of Rating				
Company	Year-End 2004	Year-End 2003	Year-End 2002	Year-End 2001	Year-End 2000	Aa	A	Baa	Ba	Total Days
Cascade Natural Gas Corp	n/a	n/a	n/a	n/a	n/a	0	0	0	0	0
Keyspan Corp	Baa	Baa	Baa	A	A	0	815	1012	0	1827
Laclede Group Inc	Ba	Ba	Ba	A	A	0	948	0	0	948
Northwest Natural Gas Co	n/a	n/a	n/a	Baa	Baa	0	0	731	0	731
Peoples Energy Corp	n/a	n/a	n/a	n/a	n/a	0	0	0	0	0
South Jersey Industries Inc	Baa	Baa	Baa	Baa	Baa	0	0	1827	0	1827
Southwest Gas Corp	n/a	n/a	n/a	n/a	n/a	0	0	0	0	0
Wgl Holdings Inc	Baa	Baa	Baa	A	Aa	573	504	750	0	1827

Sources and Notes:
Ratings from Moody's (www.moodys.com).
Moody's did not report preferred ratings for KeySpan Corp. The preferred ratings are assumed equal to debt until 3/26/2002. Then, they are the preferred shelf ratings.
Moody's did not report preferred ratings for Laclede Group Inc. The preferred ratings are assumed equal to debt until 8/6/2002. Then, they are preferred shelf ratings.
The ratings for Northwest Natural Gas Co are for preference stocks.
Moody's did not report preferred ratings for South Jersey Industries Inc. Preferred ratings are assumed to be equal to bond ratings.

Workpaper #2 to Table No. MJV-21

2004 Gas LDC Sample

Panel A: Bond Yield Summary, 2000 to 2004

	% Days at Rating				Bond Yields			
Company	Aa [1]	A [2]	Baa [3]	Total [4]	Aa [5]	A [6]	Baa [7]	5-Year Weighted Average Bond Yield [8]
Cascade Natural Gas Corp	0%	0%	100%	100%	5.55%	5.61%	5.76%	5.76%
Keyspan Corp	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
Laclede Group Inc	0%	52%	48%	100%	5.55%	5.61%	5.76%	5.68%
Northwest Natural Gas Co	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
Peoples Energy Corp	0%	100%	0%	100%	5.55%	5.61%	5.76%	5.61%
South Jersey Industries Inc	0%	0%	100%	100%	5.55%	5.61%	5.76%	5.76%
Southwest Gas Corp	0%	0%	100%	100%	5.55%	5.61%	5.76%	5.76%
Wgl Holdings Inc	59%	41%	0%	100%	5.55%	5.61%	5.76%	5.57%

Sources and Notes:
[1] - [3]: Calculated from Workpaper #1 to Table No. MJV-21; Panel A.
[4]: [1] + [2] + [3].
[5] - [7]: Mergent Bond Record, March 2005.
[8]: [1] x [5] + [2] x [6] + [3] x [7].

Workpaper #2 to Table No. MJV-21

2004 Gas LDC Sample

Panel B: Preferred Equity Yield Summary, 2000 to 2004

	% Days at Rating					Preferred Debt Yields				
Company	Aa [1]	A [2]	Baa [3]	Ba [4]	Total [5]	Aa [6]	A [7]	Baa [8]	Ba [9]	5-Year Weighted Average Preferred Yield [10]
Cascade Natural Gas Corp	n/a	n/a	n/a	n/a	n/a	6.22%	6.29%	6.36%	6.43%	n/a
Keyspan Corp	0%	45%	55%	0%	100%	6.22%	6.29%	6.36%	6.43%	6.33%
Laclede Group Inc	0%	100%	0%	0%	100%	6.22%	6.29%	6.36%	6.43%	6.29%
Northwest Natural Gas Co	0%	0%	100%	0%	100%	6.22%	6.29%	6.36%	6.43%	6.36%
Peoples Energy Corp	n/a	n/a	n/a	n/a	n/a	6.22%	6.29%	6.36%	6.43%	n/a
South Jersey Industries Inc	0%	0%	100%	0%	100%	6.22%	6.29%	6.36%	6.43%	6.36%
Southwest Gas Corp	n/a	n/a	n/a	n/a	n/a	6.22%	6.29%	6.36%	6.43%	n/a
Wgl Holdings Inc	31%	28%	41%	0%	100%	6.22%	6.29%	6.36%	6.43%	6.30%

Sources and Notes:
[1] - [4]: Calculated from Workpaper #1 to Table No. MJV-21; Panel B.
[5]: [1] + [2] + [3] + [4].
[6]: [7] - ([8] - [7]).
[7] - [8]: Mergent Bond Record, March 2005.
[9]: [8] + ([8] - [7]).
[12]: [1] x [6] + [2] x [7] + [3] x [8] + [4] x [9].

Table No. MJV-22

Risk Positioning Cost of Equity at Paradise Valley Water Company's Capital Structure

Panel A: 2004 Gas LDC Sample
Using All Companies

	Overall Cost of Capital [1]	Paradise Valley Water Company's Regulatory % Debt [2]	Paradise Valley Water Company's Cost of Debt [3]	Arizona-American Water Company's Income Tax Rate [4]	Paradise Valley Water Company's Regulatory % Equity [5]	Estimated Return on Equity [6]
Using Long-Term Risk-Free rates:						
CAPM using Unadjusted ValueLine Betas	6.4%	0.63	5.6%	39.5%	0.37	11.7%
ECAPM (0.5 %) using Undjusted ValueLine Betas	6.6%	0.63	5.6%	39.5%	0.37	12.0%
ECAPM (1.5%) using Undjusted ValueLine Betas	6.8%	0.63	5.6%	39.5%	0.37	12.7%
Using Short-Term Risk-Free rates:						
CAPM using Unadjusted ValueLine Betas	5.8%	0.63	5.6%	39.5%	0.37	9.9%
ECAPM (1%) using Unadjusted ValueLine Betas	6.0%	0.63	5.6%	39.5%	0.37	10.6%
ECAPM (2%) using Unadjusted ValueLine Betas	6.3%	0.63	5.6%	39.5%	0.37	11.3%
ECAPM (3%) using Unadjusted ValueLine Betas	6.5%	0.63	5.6%	39.5%	0.37	11.9%

Sources and Notes:
[1]: Table No. MJV-21; Panels A - G, [8].
[2]: Paradise Valley Water Company.
[3]: Mergent Bond Record, March 2005. Based on an A rating.
[4]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.
[5]: Paradise Valley Water Company.
[6]: {[1] - [2] x [3] x (1 - [4])} / [5].

Table No. MJV-22

Risk Positioning Cost of Equity at Paradise Valley Water Company's Capital Structure

Panel B: 2004 Gas LDC Sample

Using companies with CAPM cost of equity greater than cost of debt plus 25 basis points and with 5-year average revenues from regulated activities greater than 70%.

	Overall Cost of Capital [1]	Paradise Valley Water Company's Regulatory % Debt [2]	Paradise Valley Water Company's Cost of Debt [3]	Paradise Valley Water Company's Tax Rate [4]	Arizona-American Water Company's Income Tax Rate [5]	Estimated Return on Equity [6]
Using Long-Term Risk-Free rates:						
CAPM using Unadjusted ValueLine Betas	6.3%	0.63	5.6%	39.5%	0.37	11.3%
ECAPM (0.5 %) using Undjusted ValueLine Betas	6.4%	0.63	5.6%	39.5%	0.37	11.7%
ECAPM (1.5%) using Undjusted ValueLine Betas	6.7%	0.63	5.6%	39.5%	0.37	12.4%
Using Short-Term Risk-Free rates:						
CAPM using Unadjusted ValueLine Betas	5.8%	0.63	5.6%	39.5%	0.37	10.1%
ECAPM (1%) using Unadjusted ValueLine Betas	6.1%	0.63	5.6%	39.5%	0.37	10.7%
ECAPM (2%) using Unadjusted ValueLine Betas	6.3%	0.63	5.6%	39.5%	0.37	11.4%
ECAPM (3%) using Unadjusted ValueLine Betas	6.6%	0.63	5.6%	39.5%	0.37	12.0%

Sources and Notes:

[1]: Table No. MJV-21; Panels A - G, [8].

[2]: Paradise Valley Water Company.

[3]: Mergent Bond Record, March 2005. Based on an A rating.

[4]: Federal Tax Rate + (1-Federal Tax Rate) x Arizona State Tax Rate {35% + (1-35%) x 6.968%}.
Arizona State Tax Rate from http://www.taxadmin.org/fta/rate/corp_inc.html.

[5]: Paradise Valley Water Company.

[6]: {[1] - [2] x [3] x (1 - [4])} / [5].

GROSS

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY DISTRICT	DOCKET NO. W-01303A-05-____

DIRECT TESTIMONY
OF
JOSEPH E. GROSS, P. E.
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

DIRECT TESTIMONY
OF
JOSEPH E. GROSS P.E.
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND TELEPHONE NUMBER.

A. My name is Joseph E. Gross. My business address is 19820 N. 7th Street, Suite 201, Phoenix, Arizona 85024 and my telephone number is 623-445-2401.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Arizona-American Water Company, Inc. ("Arizona-American" or the "Company") as Project Delivery Manager ("Engineering Manager") for Arizona.

Q. PLEASE BRIEFLY OUTLINE YOUR RESPONSIBILITIES AS THE ENGINEERING MANAGER.

A. I am responsible for project delivery of Arizona-American Water's capital program; first providing input to the budgeting process, then providing oversight of the design and construction contracts to ensure compliance with assigned budget and schedule.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I received a Bachelor of Science degree from the United States Military Academy in civil engineering in 1962 and a Master of Science degree from the Ohio State University in Geodetic Science in 1968.

Q. DID YOU SERVE IN THE MILITARY FOLLOWING YOUR GRADUATION FROM THE UNITED STATES MILITARY ACADEMY?

A. Yes. I served as an officer in the United States Army for 28 years, including 12 months in Vietnam as a combat engineer battalion advisor; and 18 months as a battalion commander in the 101st Airborne Division. In 1979, I began a number of assignments with the US Army Corps of Engineers, where I served until retirement in 1990.

Q. HAVE YOU HAD ANY OTHER FORMAL TRAINING?

A. I attended two-week senior executive management training programs at Carnegie Mellon University in 1986 and at Arizona State University in 1994.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

A. I joined Arizona-American in October, 2004. I was previously employed by the City of Scottsdale for fourteen years in the positions of Capital Project Management Director, Water Campus Project Director, and Water Resources Director. Before that, I had extensive field-level and executive-level experience in the US Army Corps of Engineers, including large projects located in the United States, Iran, and Saudi Arabia. Among other responsibilities, I supervised the Corps' extensive flood-control projects in the Phoenix metropolitan area from 1979 to 1982. This included the construction of the Indian Bend Wash flood-control facilities in Scottsdale, construction of Cave Buttes and Adobe Dams in north Phoenix, and design of the Arizona Canal Diversion Channel.

Q. ARE YOU A REGISTERED PROFESSIONAL ENGINEER?

A. I am a registered Professional Engineer in the states of Arizona and Pennsylvania.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE UTILITY REGULATORY COMMISSIONS?

A. I filed testimony this year with the Commission in the Company's arsenic-cost-recovery mechanism ("ACRM") case for its Agua Fria, Sun City West, and Havasu Water Districts (Docket No. W-1303A-05-0280, *et. al*). I am scheduled to testify in July 2005.

II. PURPOSE OF TESTIMONY, SUMMARY, AND CONCLUSIONS

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to describe plant improvements required to comply with the unfunded Federal mandate for meeting reduced arsenic levels in drinking water; and the need to upgrade the existing distribution system in Paradise Valley to provide adequate fire-flow capacity. The Company proposes to recover most arsenic-remediation costs through an ACRM surcharge and the fire-flow upgrade costs through a public-safety surcharge ("PS Surcharge"). I have attached four exhibits to my testimony:

1. Exhibit A - a site plan for the Paradise Valley Arsenic Removal Facility;
2. Exhibit B - a functional description and cost estimate of the capital improvements needed at that site to comply with the new Federal water quality regulations;
3. Exhibit C – a map of the Company's Paradise Valley District service area; and

4. Exhibit D – a summary of the capital improvements and estimated costs needed to provide adequate fire flow capacity for the Paradise Valley Water District.

III. DESCRIPTION OF COMPANY-FUNDED CONSTRUCTION AND BUDGETING PROCESS

Q. PLEASE DESCRIBE THE PROCEDURE UTILIZED TO IDENTIFY A COMPANY-FUNDED CONSTRUCTION PROJECT?

A. Arizona-American annually prepares and maintains a current five-year capital-expenditure plan that serves as an integral component of Arizona-American's overall business plan. Each year the capital-expenditure plan is reviewed by Arizona-American and Western Region management to identify and prioritize necessary capital improvement projects to ensure quality water service, resolve operational challenges, comply with regulatory requirements, and formalize and approve the annual budget.

The capital-expenditure plan is separated into two categories: "Normal Recurring Capital Expenditures," and "Investment Projects." Normal Recurring Capital Expenditures are routine capital expenditures that are incurred to ensure operation of a reliable water system. Investment Projects are major capital improvements identified for Arizona-American's various water and wastewater districts. Investment Projects are typically the result of comprehensive planning studies ("CPS") provided by American Water's Engineering Department or by an outside engineering consultant. These studies analyze the need for specific capital projects that address reliability, aging facilities, and overall service issues that affect the source of supply, production, and distribution facilities of a specific water system.

Q. WHO DETERMINES HOW MUCH MONEY WILL BE SPENT ON COMPANY-FUNDED PROJECTS?

A. The Arizona-American Engineering group prepares an investment project memorandum for each investment project. This investment project memorandum concisely presents the need for the project, details the recommended improvements, explains the scope of the work to be performed, lists detailed cost estimates, presents a project schedule and includes a financial analysis. Thereafter, the investment project is included in the annual capital expenditure plan, where it is reviewed, critiqued and discussed in detail to ensure that the projects is a reasonable and prudent investment, after which it is typically approved by the Western Region Capital Investment Management Committee ("CIMC"). If the CIMC does not approve the request, it is either sent back to the Arizona-American Engineering group for revision, or it is rejected. If the CIMC approves the project, it is sent to American Water's Capital Investment Review Committee in New Jersey, where it is reviewed, critiqued, and typically approved.

IV. DESCRIPTION OF COMPANY FUNDED ADDITIONS

A. PARADISE VALLEY ARSENIC REMOVAL FACILITY

Q. PLEASE DESCRIBE THE PARADISE VALLEY ARSENIC-REMOVAL FACILITY.

A. The Paradise Valley arsenic-removal facility project, required by the new Federal water quality regulations, is described in detail in Exhibit B. The total project cost is approximately $20 million and includes a coagulation-filtration treatment process, new booster pump stations to move the water through the filters, a 1.5 million gallon reservoir to provide finished water storage and backwash water for the filters, a gravity thickener for dewatering the coagulant, emergency generator, process laboratory and appropriate electrical and control systems. The total cost also includes extensive landscaping and aesthetic treatment of the operations building, perimeter wall, and water storage tanks, which are required by the City of Scottsdale to obtain a building permit.

B. <u>PARADISE VALLEY PUBLIC-SAFETY IMPROVEMENTS</u>

Q. PLEASE DESCRIBE THE PARADISE VALLEY PUBLIC-SAFETY IMPROVEMENTS.

A. The Paradise Valley Public-Safety Improvements result from a comprehensive study that the firm of Brown & Caldwell, completed in 2004, of distribution system improvements needed to improve fire-flow capacity throughout the Paradise Valley Water District. Brown & Caldwell proposed a six-phase plan of improvements for a total cost of $15.6 million. To provide adequate water storage capability for meeting residential fire flow requirements of 1500 gallons per minute for two hours, a second 1.5 million gallon reservoir is also planned at the site of the arsenic removal facility in 2006. The cost of this reservoir is estimated at $750,000. Since the need for additional storage capacity had been identified in an internal comprehensive planning study in 1999, it was not further addressed by the Brown & Caldwell study. Exhibit C provides a location map of the service area, which shows the location of the major facilities. Exhibit D includes a table with project descriptions, phasing plan, and cost estimates to include the reservoir.

Q. HAVE ANY OF THE PARADISE VALLEY PUBLIC-SAFETY IMPROVEMENTS BEEN COMPLETED?

A. Yes. Phase I, referred to as the Jackrabbit/Invergordon Water Main Replacement Project, consisted of replacing one-half mile of six-inch asphalt concrete pipe with 16-inch ductile iron pipe on Invergordon Road from Jackrabbit to McDonald. In addition, the project included replacing one mile of four-inch asphalt concrete pipe with 24-inch ductile-iron pipe on Jackrabbit Road from Invergordon Road to Scottsdale Road. These capital plant additions were completed and placed into service in March 2005, and are currently being utilized to serve existing customers within the Paradise Valley District. The total cost for these plant additions was $1,818,226.04.

Another project is currently under construction and will be in service in 2005. It consists of pipeline replacements in McDonald Drive, between 44th Street and Tatum Boulevard. This project appears in Exhibit D as Project 8, and was originally scheduled in 2007. The Town of Paradise Valley is currently relocating a large section of Tatum Boulevard, and asked the Company to coordinate our pipeline replacement with this project. To accommodate the Town's construction schedule, and because of repeated pipeline breaks this past winter, we decided to install this section of pipeline during 2005. The current construction cost is estimated at $667,000. The remainder of Project 8 will be constructed in 2007.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes it does.

0 50 100 200
SCALE IN FEET
1"=100'

McCloskey • Peltz, Inc.
LANDSCAPE ARCHITECTS
One West Elliot Road Suite 110 Tempe, Arizona 85284
Phone: (480) 838-4777 Fax: (480) 831-1774

REVISIONS

Paradise Valley Arsenic Removal Facility
LANDSCAPE
CONTEXT SITE PLAN

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT

DAMON S. WILLIAMS ASSOCIATES, LLC
2355 E. CAMELBACK ROAD, SUITE 700
PHOENIX, AZ 85016

DRAWN BY MPI
PROJECT ENG'R DCM
APPROVED

DATE NOVEMBER 2004
PROJECT 23020203

USE DIMENSIONS ONLY
SCALE NA

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

2302-0001-L01

PRELIMINARY

ARIZONA AMERICAN WATER
PARADISE VALLEY DISTRICT

ARSENIC REMOVAL FACILITY
DESIGN CONCEPT

AMERICAN WATER WORKS SERVICE COMPANY, INC.
SYSTEM ENGINEERING
1025 Laurel Oak Road
Voorhees, New Jersey 08043
December 2003

PART I
PROJECT BACKGROUND

A. INTRODUCTION

Arizona American Water's (AAW) Paradise Valley District supplies potable water to approximately 4,600 customers in portions of the Town of Paradise Valley, City of Scottsdale, and unincorporated Maricopa County. The District obtains its water supplies from a total of seven groundwater wells. Arsenic is present in all of the groundwater supplies at levels approaching or exceeding the 0.010 mg/L (10 ug/L) maximum contaminant level (MCL) that was recently promulgated by the US Environmental Protection Agency (EPA). Arsenic removal facilities will need to be installed and in service by the Arsenic Rule's effective date of January 23, 2006 to comply with the pending MCL.

An evaluation of treatment alternatives was completed in October of 2003 to determine which treatment alternative is most appropriate for the Paradise Valley District. The evaluation took into consideration the seven treatment technologies identified by the US EPA as Best Available Technologies (BAT) for the removal of arsenic from drinking water supplies. Consideration was also given to the use of disposable, iron-based adsorbent media, which has been shown to be an effective alternative through numerous pilot studies, and is identified as an approved technology in the Arizona Department of Environmental Quality's (AZDEQ) Arizona Arsenic Master Plan. The US EPA has not yet designated iron-based adsorbent media as a BAT.

It was concluded through a preliminary screening of the alternatives that the ferric chloride coagulation/filtration (CF) and disposable iron-based adsorbent media processes were the most feasible alternatives for the Paradise Valley District. It was subsequently determined through a detailed analysis, that a single, centralized CF treatment facility would be more cost-effective than one or more iron-based adsorbent media treatment facility(s), both on a capital cost and annual operating cost basis. Therefore, AAW has decided to proceed with construction of a CF treatment facility to remove arsenic from water supplies in its Paradise Valley District. This document summarizes the criteria to be used in the design of the proposed Paradise Valley Arsenic Removal Facility (PVARF).

B. EXISTING SYSTEM CONFIGURATION

The Paradise Valley District's seven wells are all located in the City of Scottsdale along the eastern edge of the service area. Figure 1 is a schematic showing how the wells and associated treatment and distributive pumping facilities are currently configured. Three of the wells (Wells 11, 12, and 17) pump to the Miller Road Booster Station (MRBS), where the supplies are blended and stored for subsequent pumping into the distribution system. Well 16 pumps directly into the distribution system. The remaining three wells (Wells 14, 15, and PCX-1) are treated at the Miller Road Treatment Facility (MRTF) before being pumped into the distribution system.

Currently, chlorine is the only chemical that is added to the groundwater supplies at Well 16 and the MRBS. The MRBS is also equipped with a series of storage tanks that allow sand or other sediment to settle out of the well supplies before they are pumped into the distribution system. In addition, the MRBS is used to blend water from Well 17 with supplies from Wells 11 and 12 prior to entry into the distribution system. By so doing, the concentration of nitrates in the Well 17 supply is reduced to below the drinking water MCL.

The MRTF was constructed in 1996 to remove trichloroethylene (TCE) that had been detected in groundwater supplies to the south of the Paradise Valley District's wells. The facility utilizes counter-current packed-tower aeration to strip TCE from the water supply. Vapor-phase granular activated carbon (GAC) is used to remove TCE from the off-gas from the air strippers. Finished water is stored in a concrete clearwell beneath the facility before being pumped into the distribution system.

Well PCX-1 contains elevated levels of TCE, and is operated on an almost continuous basis in an effort to prevent migration of TCE contamination to AAW's other wells. Nonetheless, TCE has been detected at low levels in Well 15, so both Well PCX-1 and Well 15 are currently treated by aeration. Well 14 is also routed to the MRTF, but its flow bypasses aeration since TCE contamination has not been detected in this supply to date. The effluent from the stripping towers and Well 14 blend in the clearwell at the MRTF. Well PCX-1 is actually owned by the Salt River Project (SRP), but its supply is used by AAW in exchange for a portion of AAW's allocation of surface water from the Central Arizona Project (CAP) canal system. The MRTF was designed to allow for future expansion should groundwater contamination continue to spread and impact AAW's other wells. Provisions must be included in the design of the proposed arsenic treatment facility to allow for expansion of the treatment capacity and routing of all well supplies to/from the MRTF if groundwater contamination impacts other AAW wells in the future.

C. WATER QUALITY

Table 1 presents summary information about each of the seven wells serving the Paradise Valley District. The table shows that the average concentration of arsenic in all but two of the wells exceeds the 10 ug/L MCL. Further, although arsenic levels in Wells 17 and PCX-1 have averaged less than 10 ug/L, maximum arsenic levels in both wells are at or close to the MCL. Also, since both of these wells are blended with other supplies because of other water quality concerns, the concentration of arsenic at all three points of entry into the Paradise Valley distribution system may exceed the MCL if treatment is not provided. Table 2 presents additional water quality data from each of the groundwater supply wells in the Paradise Valley District.

D. TREATMENT FACILITY SITE

As part of the evaluation of treatment alternatives, it was determined that the proposed PVARF should be located on property currently occupied by the MRBS and a number of AAW's wells. The 11.5-acre site is bounded on the west by Miller Road, the east by the Arizona Canal, and the north and south by private parcels. Booster pumping equipment and associated water storage tanks and electrical facilities are positioned near the center of the property, with Wells 11, 12, and 16 spaced out along the Arizona Canal. A 2,500-square foot storage warehouse is also present near the center of the property. The remainder of the site is currently undeveloped. The Water Company is planning to subdivide the northern half of the property to make it available for residential development. The southern half will house the proposed arsenic treatment facility. The existing MRBS will be replaced by new finished water storage reservoirs and a larger booster pump station to be constructed as part of the proposed facility.

Table 1
Summary of Select Well Characteristics – Paradise Valley District

Well ID	Year Drilled	Depth (ft)	Motor (HP)	Capacity (gpm)	Arsenic (ug/L)[1]	
					Average	Maximum
11	1959	1,372	300	1,800	13.5	18
12	1962	1,301	300	1,800	11.1	13
14	1965	1,743	400	2,100	10.9	12
15	1969	1,430	400	2,100	10.9	14
16	1980	1,500	600	2,200	12.7	18
17	1993	1,145	600	2,500	8.8	10
PCX-1	1997	1,245	600	2,300	8.5	9
TOTAL / AVERAGE[2]				**14,800**	**10.9**	**13.2**

1. Arsenic data are based on approx. 10 samples collected between 1995 and 2002.
2. The system-wide concentration values based on the flow-weighted capacity of each well.

Table 2
Paradise Valley District – Groundwater Quality Data

Parameter[1]	Well						
	11	12	14	15	16	17	PCX-1
pH	7.9	7.8	7.8	7.8	7.9	7.6	7.7
Alkalinity (as $CaCO_3$)	N/A	N/A	144	141	N/A	N/A	113
Hardness (as $CaCO_3$)	125	149	155	140	185	268	206
Temperature (^oC)	33	33	33	33	33	33	33
Nitrate (as N)	4.1	3.9	4.9	3.0	3.5	11.5	4.9
Iron	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Manganese	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride	0.45	0.42	0.44	0.57	0.96	0.24	0.29
Silica	28	30	30	30	30	32	N/A
Sulfate	35	30	46	13	26	81	76
TDS	325	330	280	24	340	490	N/A

1. All units in mg/L except pH and temperature.

E. DISTRIBUTION SYSTEM

Currently, water supplies enter the distribution system through three distinct points of entry (POEs). After completion of the proposed treatment facility, the Well 16 POE will be eliminated and finished water will be routed to the distribution system via just two POEs. One POE will be the same as or adjacent to the existing MRBS POE, and the second will be near the existing MRTF POE. With proper sizing of the finished water transmission mains, distribution system hydraulics and pressure conditions should remain similar to the current conditions, even with the elimination of the Well 16 POE.

F. FUTURE DEMANDS AND SUPPLIES

In 1999, a Comprehensive Planning Study (CPS) was completed for the Paradise Valley District, which included projections of average and maximum daily demands through the year 2012. According to the CPS, future average and maximum day demands in the Paradise Valley District may reach 11.3 mgd and 19.3 mgd, respectively.

The combined capacity of the district's seven existing wells totals approximately 21.3 mgd (14,800 gpm), with a reliable production capacity of about 17.7 mgd (12,300 gpm) assuming the largest capacity well is out of service. Although the District has adequate reliable capacity to meet current maximum day demands, it was recommended in the CPS that AAW obtain a backup supply of water from another SRP-owned well (SRP-22.6) to ensure that adequate reliable capacity would be available in the future. Well SRP-22.6 is located on the opposite side of the Arizona Canal near Well 14. The concentration of arsenic in Well SRP-22.6 is not known at the present time. For the purpose of designing the proposed treatment facility, the concentration of arsenic in Well SRP-22.6 should be assumed to be equal to the highest concentration measured in the district's other existing well supplies. The design should include provisions to allow for the future connection of Well SRP-22.6, including the possibility that this well may or may not need to be treated at the MRTF before being treated at the PVARF.

G. PRELIMINARY CONSTRUCTION COST ESTIMATE

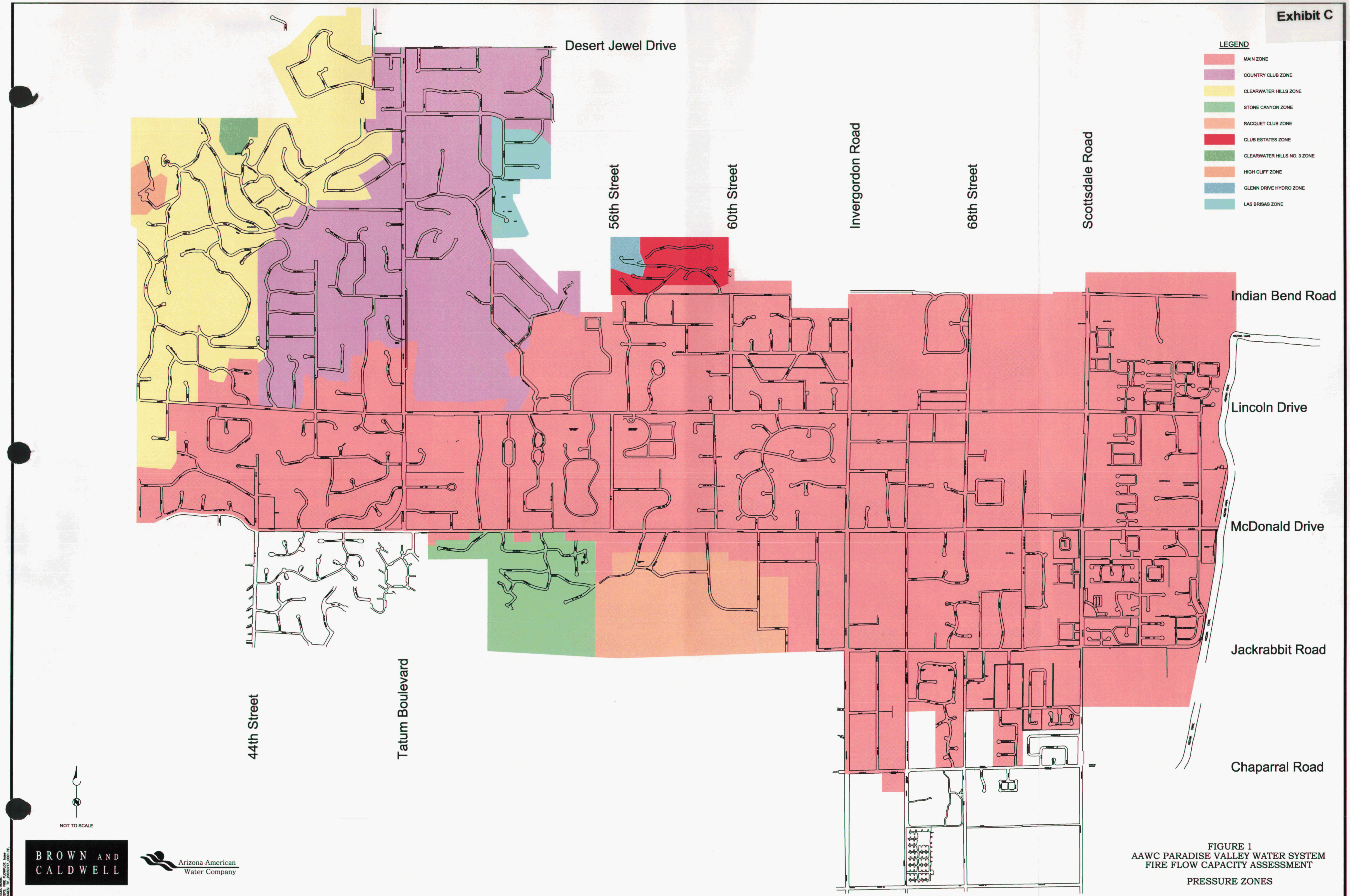
A preliminary construction cost estimate was developed as part of the evaluation of alternatives for the Paradise Valley District. The cost included the proposed CF facilities, raw and finished water transmission mains, finished water storage and pumping facilities, chemical storage and feed facilities, residuals handling and dewatering facilities, and associated electrical, instrumentation and site improvements, plus new administrative office space for district personnel. Table 3 presents a breakdown of the costs for the various construction categories. The total construction cost is estimated to be $17.44 million. This cost does not include engineering, permits, and AFUDC.

Arizona-American Water Company - Paradise Valley
Coagulation/Filtration Treatment Facility
Estimate of Probable Construction Costs

Division	Item	Total
2	Sitework	$1,855,673
	Yard Piping	$1,483,595
	Transmission Main	$1,510,896
3	Concrete	$1,530,236
4	Masonry	$267,126
5	Metals	$403,093
6	Wood/Plastics	$109,832
7	Thermal/Moisture Protection	$259,958
8	Doors/Windows	$241,372
9	Finishes	$193,395
10	Building Specialities	$199,049
13	Special Construction	
	Steel Reservoir	$657,005
15	Mechanical	$3,063,131
	Filter Vessel Mechanical	$1,735,745
16	Electrical	$3,483,350
	Instrumentation	$450,000
CONSTRUCTION SUBTOTAL		$17,443,456
	Engineering	
	DSWA Design	$1,399,058
	DSWA Construction Admin.	$291,701
	DSWA Design Changes	$118,000
	Special Inspections	$57,800
	AW Design	
	Construction Admin./Inspection	$400,000
	Engineering Total	$2,266,559
	Contingency (5% of construction)	$872,173
	AFUDC (7% of construction)	$1,221,042
PROJECT TOTAL		$21,803,230

1-Apr-05

Exhibit C



BROWN AND CALDWELL

Arizona-American Water Company

FIGURE 1
AAWC PARADISE VALLEY WATER SYSTEM
FIRE FLOW CAPACITY ASSESSMENT

PRESSURE ZONES

Exhibit D

ARIZONA-AMERICAN WATER COMPANY

PARADISE VALLEY FIRE FLOW IMPROVEMENTS

PROPOSED PHASING

2004 Improvements

Project #	Description	# Fire Hydrants (Note 1)	Fire Hydrant Cost	LF of 4" WM	4" WM replacement cost	Total
	Fire Hydrants	40	$ 200,000			$ 200,000
	Jackrabbit/Invergordon 12" Main	20	$ 100,000	10,000	$ 517,500	$ 1,425,000
Total 2004 Improvements		60		10,000		**$ 1,625,000**

2005 Improvements

Project #	Description	# Fire Hydrants	Fire Hydrant Cost	LF of 4" WM	4" WM replacement cost	Total
1	16" WM Lincoln/New CCBPS					$ 1,255,570
3	16" WM Tatum	6	$ 30,000	3,400	$ 175,950	$ 935,510
9	8" WM Tatum					$ 113,850
	Contingency (10%)					$ 230,493
2005 Total		6		3,400		**$ 2,535,423**

2006 Improvements

Project #	Description	# Fire Hydrants	Fire Hydrant Cost	LF of 4" WM	4" WM replacement cost	Total
2	BPS CWH/8" WM Highland Drive					$ 382,375
4	8" WM - S. CC zone	5	$ 25,000	1,950	$ 100,913	$ 326,731
5	Replace 4" WM/CWSHBPS	5	$ 25,000	2,450	$ 126,788	$ 638,813
6	Stone Canyon/Racquet Club					$ 577,875
10	8" WM - N. CC Zone					$ 306,763
1A	1.5MG Reservoir					$ 750,000
	Contingency (10%)					$ 298,256
2006 Total		10		4,400		**$ 3,280,812**

2007 Improvements

Project #	Description	# Fire Hydrants	Fire Hydrant Cost	LF of 4" WM	4" WM replacement cost	Total
7	8" WM Clearwater Parkway					$ 56,925
8	16" WM McDonald & 44th Street	40	$ 200,000			$ 1,378,520
10	12" WM N. CC Zone	5	$ 25,000			$ 206,125
11	Las Brisas fire Pump and 8" WM	5	$ 25,000			$ 417,438
12A	12" and 8" WM serving Tatum Canyon					$ 387,090
	Contingency (10%)					$ 244,610
2007 Total		50		-		**$ 2,690,707**

2008 Improvements

Project #	Description	# Fire Hydrants	Fire Hydrant Cost	LF of 4" WM	4" WM replacement cost	Total
	Reevaluation					$ 100,000
	4" Main Replacements	50	$ 250,000	27,000	$ 1,536,975	$ 1,786,975
16	8" WM Main Zone North					$ 480,700
	Valve Study					$ 120,000
	Contingency (10%)					$ 248,768
2008 Total		50		27,000		**$ 2,736,443**

2009 Improvements

Project #	Description	# Fire Hydrants	Fire Hydrant Cost	LF of 4" WM	4" WM replacement cost	Total
13	8"/6" cactus Wren/Sierra Vista			6,260	$ 323,955	$ 359,318
14	8" WM Invergordon			8,320	$ 430,560	$ 538,085
15	8" WM Chaparral	14	$ 70,000	4,700	$ 243,225	$ 484,000
17B	8"/6" Keim/Bethany Home area	2	$ 10,000	1,000	$ 51,750	$ 218,840
18	Club Estates/Glen Drive Fire Pump					$ 614,790
19	Stone Canyon 4" WM replacements	8	$ 40,000	3,700	$ 191,475	$ 435,456
	4" Main Replacements	20	$ 100,000	11,220	$ 638,699	$ 738,699
	Contingency (10%)					$ 338,919
2009 Total		44		35,200		**$ 3,728,106**
TOTAL ALL PHASES		**220**		**80,000**		**$ 16,596,491**

Note 1 Number of Fire Hydrants approxiamate and will be adjusted to meet Town spacing requirements

5/16/2005

BIESEMEYE

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY DISTRICT

DOCKET NO. W-01303A-05-____

DIRECT TESTIMONY
OF
BRIAN K. BIESEMEYER
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

DIRECT TESTIMONY
OF
BRIAN K. BIESEMEYER
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

TABLE OF CONTENTS

I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND TELEPHONE NUMBER.

A. Brian K. Biesemeyer, 15626 N. Del Webb Blvd, Sun City, AZ, 623-815-3125.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Arizona-American Water Company ("Arizona-American" or the "Company") and I am the Network General Manager

Q. WHAT ARE YOUR RESPONSIBILITIES AS THE NETWORK GENERAL MANAGER?

A. I am responsible for customer service, water distribution, and wastewater collection operations statewide serving over 131,000 customers.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I received a Masters of Science in Civil Engineering, a Masters of Science in Mineral Economics and a Bachelor in Science in Geological Engineering all from the University of Arizona in 1994, 1984, and 1982 respectively.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

A. I am a Registered Professional Engineer with a Proficiency in Environmental Engineering. I am also a Grade IV Arizona Department of Environmental Quality

(ADEQ) Certified Operator in Water Treatment, Water Distribution, Wastewater Treatment, and Wastewater Collection. I have worked in the water industry for over twelve years in research, government, and the private sector. Prior to my current job, I was the Operations Manager for Arizona-American's Central Operations which included all operations in Maricopa and Santa Cruz County

Q. HAVE YOU HAD ANY OTHER RELEVANT PROFESSIONAL EXPERIENCES?

A. I am a member of ADEQ's Operator Certification with the responsibility of identifying operator compliance issues and requirements impacting operators, and to develop and recommend solutions, which will support ADEQ's operator certification program

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE UTILITY REGULATORY COMMISSIONS?

A. No.

II. PURPOSE OF TESTIMONY, SUMMARY AND CONCLUSIONS

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I will discuss:

1. The community and planning process for the Paradise Valley Fire Flow Improvement Program.
2. The value of separating Meter and Service-Line charges.

3. Staffing changes since the end of the Test Year.

III. PARADISE VALLEY FIRE FLOW IMPROVEMENT PROGRAM

Q. WHY IS ARIZONA-AMERICAN UNDERTAKING THE PARADISE VALLEY FIRE FLOW IMPROVEMENT PROGRAM?

A. The Town of Paradise Valley ("Town") is asking us to undertake this project. The Town became concerned about the fire-flow capabilities of the water systems servicing the Town in 2002 after a lightning strike ignited a blaze, destroying a large home. News investigation into the fire raised concerns about the adequacy of fire flow during fire fighting operations.

Q. PLEASE DESCRIBE THE INITIAL COMMUNITY AND PLANNING STEPS.

A. In April 2003, Arizona-American spoke to the Town Council Water Committee about the capacity of Arizona-American's system. Arizona-American discussed how Commission regulations only require a minimum pressure at the meter, with no specific standards for fire flow. To address the gap between reality and what was desired by the Town, Arizona-American proposed forming a working group of its customers to address the issue with the community.

Q. PLEASE DESCRIBE THE WORKING GROUP PROCESS AND RESULTS.

A. In July 2003, Arizona-American, working with the Town, formed the Paradise Valley Water Users Group (Users Group), with representation from throughout the community and Arizona-American's customer base, including representatives from areas in Scottsdale and unincorporated Maricopa County.

The Users Group met on four occasions from July through October 2003. Arizona-American hired Dr. Marty Rozelle, President of the Rozelle Group, Ltd., as facilitator, and Brown & Caldwell Engineering Company as engineering and water-modeling experts for the Users Group. The Users Group reviewed water modeling results for the Paradise Valley Water District, listened to the community's concerns, set priorities for making improvements, and then reviewed and endorsed a Fire Flow Improvement Plan (FFIP) proposed by Arizona-American. The Users Group determined that Arizona-American should observe the following priorities in making improvements:

1. Make improvements in those areas with the smallest amount of existing fire flow (less than 500 gallons per minute (gpm) first, 500-1000 gpm second, and 1000-1500 gpm third); and
2. Make improvements in order of cost effectiveness as measured by a ratio of cost per customer impacted. The lower the cost per individual impacted, the higher the priority. The thought was that by doing the most cost effective projects first, a larger number of people would be impacted per dollar spent and the higher cost projects that impacted only a few individuals would be scheduled later in the FFIP. It was assumed that these later projects might benefit as technology develops, thereby reducing the ultimate cost of the improvement.

Based on the Users Group's priorities, Arizona American developed a six-year, $15.5 million, FFIP that incorporated all the Users Group's priorities, along with a cost-effective means of staging and grouping projects. Totaling the FFIP with arsenic treatment facility investments (estimated at that time at over $15 million), plus $7.5 million in other estimated system improvements, Arizona-American estimated the total rate impact by 2010, after all investments are complete, to be 89%.

Arizona-American briefed the Town Council Water Committee on November 4, 2003, and the full Paradise Valley Town Council on December 18, 2003, on the User Group's findings and the FFIP. A copy of the Town Council minutes is attached to my testimony as Exhibit A. These briefings included the Company's estimated 89% rate impact. Both the Committee and the Town Council were impressed with the findings and the FFIP.

Q. HOW WOULD YOU CHARACTERIZE THE TOWN'S PRESENT AWARENESS AND SUPPORT FOR THE FIRE FLOW PROJECTS?

A. I regularly attend the Town's Water Committee meetings and explain our progress to-date and upcoming plans. The Town wants the Company to continue to make progress towards completing the projects and expects that they will be completed. The Town would prefer that we complete projects even faster than our plans indicated. The Town understands there are upcoming rate increases associated with both the fire flow improvement and arsenic removal facility. Town officials requested that I send all our

Paradise Valley water customers a letter explaining our rate request shortly after it is filed and I intend to do that.

Q. ARE ANY OF THE OTHER WATER UTILITIES IN PARADISE VALLEY IMPROVING FIRE FLOWS?

A. Yes. Both the City of Phoenix and Berneil Water Company have also begun projects to improve fire flows within the Town at the Town's request.

IV. SERVICE LINE AND METER-INSTALLATION CHARGES.

Q. WHY DOES ARIZONA-AMERICAN WATER PROPOSE SEPARATING THE METER INSTALLATION AND SERVICE LINE CHARGES?

A. This proposed change gives our customers a more flexible rate schedule when changing meter size or upgrading a service line. For example, we have some Paradise Valley customers with one-inch service lines and ¾-inch meters. If a customer desires to upgrade to a one-inch meter (perhaps to support a residential fire-sprinkler system), we would not have to alter the service line size, but the customer would still have to pay the same charge as someone who is having both the service line and meter replaced. In the proposed rate structure, this customer would only pay for a meter replacement.

Q. ARE THESE CHARGES SEPARATE IN YOUR OTHER WATER DISTRICTS IN ARIZONA?

A. Yes, it matches the rate structure already existing in many of our other districts.

V. STAFFING CHANGES

Q. WHAT STAFFING CHANGES HAVE OCCURRED IN PARADISE VALLY SINCE THE TEST YEAR?

A. In late 2004, we added a Senior System Service Worker position to enhance the capabilities of the field operations crew and provide a better structure for advancement within the Paradise Valley workforce. The Senior System Service Worker position is a team lead position under the Field Foreman. Unfortunately, due to a tight market for certified water distribution operators, we were not able to fill this position in 2004.

Q. HAVE ANY ADDITIONAL NEW POSITIONS BEEN ADDED SINCE 2004?

A. Yes. In 2005, we will add a line locator position and an arsenic treatment plant operator to our Paradise Valley Staff. The line locator position will allow someone to work full time providing line locating services, which will improve our line locating service, allow us to free up other workers on our field operations staff to be more responsive to customers, and enable the staff to be more proactive in maintenance programs. A dedicated line locator position is in place in our other districts with excellent success. We will begin advertising for this position this summer.

We will also be adding a senior operator position to operate the arsenic treatment facility currently under construction. While the facility will not be completely operational until 2006, it is critical to have the operator on board early to assist with the construction management and participate in start-up operations and testing of the plant. We will begin advertising for this position this summer.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

DOCKET NO. WS-01303A-05-____
Arizona-American Water Company
Direct Testimony of Brian K. Biesemeyer
Exhibit A

TOWN OF PARADISE VALLEY
MINUTES
TOWN COUNCIL SPECIAL MEETING
DECEMBER 18, 2003

CALL TO ORDER

Mayor Lowry called the special meeting of the Town Council of the Town of Paradise Valley, Arizona, to order at 4:34 p.m. on Thursday, December 18, 2003, in the Town Hall, 6401 East Lincoln Drive, Paradise Valley, Arizona, 85253.

COUNCIL MEMBERS PRESENT

Mayor Edward Lowry
Vice-Mayor Schweiker
Council Member Stephen Benson
Council Member Ron Clarke
Council Member Rick Coffman
Council Member Virginia "Jini" Simpson
Council Member Ed Winkler

STAFF MEMBERS PRESENT

Town Manager Thomas M. Martinsen
Town Attorney Andrew Miller
Management Services Director Lenore Lancaster
Police Chief John D. Wintersteen
Public Works Director Andrew Cooper
Community Development Director Hamid Arshadi
Town Engineer William Mead
Senior Planner Eva Cutro
Capital Projects Administrator Robert Ciccarelli

WORK STUDY SESSION ITEMS

Discussion of Arizona American Water Company System Improvement Program

Mr. Martinsen introduced Brian Biesemeyer and Jim Campbell from Arizona American Water Company and Marty Rozelle, The Rozelle Group.

Councilmember Winkler said Arizona American Water Company gave a presentation to the Water Committee and the Committee felt it would be beneficial for the Council to see the presentation.

Mr. Biesemeyer said the challenge is the Town wants the fire flow service throughout the Town to be improved and yet has no direct regulatory authority over the three water providers servicing the Town. Arizona American is committed to serving the Town. They convened a customer advisory group. They used the group's input, engineering requirements and available assets to develop a 5 to 6 year capital improvement plan. The group consists of residential customers, Paradise Valley Country Club, Water Committee members, Council, Town Staff and Rural Metro. The mission of the group is to build a consensus among the representatives of all stakeholders served by Arizona American. There are 16 members who met from July through October. They had to develop a common understanding of the challenge. The Arizona American President came to a meeting and committed the resources for improving the system. The residents guided the solution. They established criteria to prioritize the projects to address areas with lowest fire flow, greatest number of people affected, and least cost per customer. They prioritized 21 projects throughout the service area. The advisory group endorsed the 6-year plan.

Mr. Biesemeyer reviewed the capital improvement program, which included an increase in size of water lines along main arteries as well as along some smaller streets, additional fire hydrants, booster pump stations, and water tanks. He said certain projects must be done first. He showed a map, indicating that the red area was where the fire flow is less than 500 gallons per minute. The tan area was 500 to 1000 gallons per minute, the blue area was 1000 to 1500 gallons per minute, and the white area was over 1500 gallons per minute. The water sources are along Scottsdale Road and the SRP canal. The backbone of the system is along Lincoln Drive, Tatum Boulevard, Invergordon Road and Jackrabbit Road, where larger water lines will be installed in 2004 and 2005. Even with the improvements by 2007 there will be some areas not meeting the 1500 gallons per minute. The total water line improvements include 18,000 linear feet of 16-inch lines, 15,000 linear feet of 12-inch lines, 36,000 linear feet of 8 inch lines and 80,000 linear feet of 6 inch lines. This represents 25% of the total existing lines. The plan includes the installation of 220 fire hydrants and installation or improvement of 6 booster stations. The estimated cost is approximately $38 million investment, of which $15.5 million is for fire flow, $15.2 million is for arsenic treatment to meet the new federal standards, and $7.5 million is planned system improvements. This is an 89% increase in rates over the next 8 years. The Arizona Corporation Commission regulates rates. Arizona American has to put the investment in first before requesting a rate increase. They have made a commitment to the Town that they will complete this plan, be flexible and cost efficient, respect the best interest of the customers, work closely with the Town, and keep the customers informed.

<u>Discussion of Tatum Blvd / McDonald Drive Intersection Improvement Project</u>

Mr. Martinsen said there have been three issues that have been discussed with the Camelhead Estates homeowners.

Mr. Mead said the three issues were the super-elevation noise modeling, the subdivision wall 2-foot extension, and the active speed monitoring signs. For the super elevation Staff went back to Higgins & Associates and asked about the noise modeling. The report accurately reflects future conditions with the proposed elevated roadway. The noise levels were modeled for both directions of traffic at 100-foot intervals. With regard to the subdivision wall, the Town asked two companies who specialize in building walls to give costs to reinforce the wall and also to remove the existing wall and build a new one. Arizona Best gave an estimate of $98,000 to reinforce the wall, and $122,000 to remove and replace the wall. They indicated that something had to be done to the wall before two feet could be added. Mr. Mead said the last issue is the active speed monitoring signs. Federal Guidelines and the Manual on Uniform Traffic Control Devices do not recognize the use of these devices. ADOT would not allow these devices to be included in the plans. However, they said that after the project is completed, the Town could install the signs. Mr. Mead said the $35,000 was an estimate of the cost to increase the wall by 2 feet if it had been structurally sound. This included stucco and painting on both sides and it covered the entire length of the wall, even though part of the wall did not need to be raised.

Rick Wilbur, resident of Marston Drive, said with regard to the super-elevation of the curve, they had been told the elevation was approximately 11 inches. Now it is 4 feet. The 8-foot wall will now only cover a portion of the elevation. With regard to the 2-foot improvement of the interior wall, he felt the Council was committed to adding the extension. He said the homeowners association advised the Town to investigate the wall to see what other costs were necessary to improve the wall.

There was Council discussion as to the previous discussions with the homeowners regarding the addition of two feet to the wall and whether the wall was structurally sound and who should make the existing wall structurally sound.

Mr. Ciccarelli stated the elevation plan has always been just less than 4 feet. The cars on the outer lane are higher, but the cars on the inner lane are lower. And the modeling done by Higgins and Associates took the elevation into consideration.

Council asked Staff to address the residents' recollection of 11 inches versus 4 feet elevation and how much of a vehicle on the far outer lane will be seen given a 6-foot sound wall on a two-foot berm. Council also asked for more information on the condition of the inner wall.

Discussion of Preserve at Lincoln Preliminary Plat and SUP for a Private Road and Guard Gate

Mr. Martinsen read a letter just handed out to withdraw the special use permit for the guard gate.

There was Council discussion that the applicant could bring back a request for a guard gate in the future. Mr. Miller said his past research has indicated that an applicant can withdraw a request for a special use permit before the start of the public hearing. Mr. Miller said there are two separate special use permits, one for a private road and one for a guard gate.

Ms. Cutro said there were three applications, one for a preliminary plat, one for a special use permit for a private road, and one for a special use permit for a guard gate. The special use permit for the guard gate has now been withdrawn. Ms. Cutro said this project was discussed at the October 23rd work session. This project is at the corner of 32nd Street and Lincoln. There will be 11 one-acre lots. The cul-de-sac is longer than 500 feet, but both the Town Engineer and the Fire Marshal prefer this configuration to other possible configurations where there would be access off Lincoln Drive or 32nd Street. She reviewed the preliminary landscape concepts. This would remain the same with the elimination of the gate. She reviewed the preliminary wall elevations, and showed the changes that would occur as a result of the elimination of the gate. She reviewed the lighting layout plan. The applicant removed the east sidewall. When those two lots are built, the homeowners may wish to put in a wall. Staff is recommending a stipulation that the walls match the existing subdivision walls. The Planning Commission recommended approval of the preliminary plat and special use permits for the private road and guard gate.

In response to a question as to whether the public could drive on the private road, Mr. Miller suggested additional wording be added to the stipulations to prohibit the subdivision from restricting the public from driving on the road.

Mr. Doug Jordan, attorney for the applicant, stated that the applicant removed the wall on the east side because they understood the Council didn't want the wall. Mr. Zacher, the applicant, said the neighbor to the south was concerned about lack of vegetation in the area and that there would be a stark wall with no vegetation. Mr. Zacher has agreed to plant vegetation on his side of the wall and there would be an easement to maintain an irrigation system. Council indicated there should be a wall on the east side, partially a view wall.

Discussion of R-175 Re-Zoning for Cameldale & Jokake Camelback

Mr. Arshadi said at the November 6 work session, Council requested that the homeowners be notified of the impact of the re-zoning on their property. The result was that four homeowners opposed the re-zoning, two properties had no response, and two property owners gave conditional approval of the rezoning. The owner of 6015 Cameldale Way was in support, but only if the entire area was re-zoned. The owner of 5500 Yucca wanted the public road on the side of his property to be given to him. Mr. Arshadi said this rezoning is not a taking. He believed that the property values will go up because Paradise Valley is located close to the Phoenix metro area. This would be a desirable place for people who want to be close to the central city, but live in a less congested area. At the public hearing he would discuss the four options for Council consideration.

Discussion of Police Department Operations and Issues

This item was not discussed.

EXECUTIVE SESSION

Discussion / consultation with attorney regarding the Town's position in pending or contemplated litigation, contract negotiations and settlement discussions as authorized by A.R.S. §38-431.03.A.4.

No action was taken.

The meeting was recessed at 6:32 p.m. until after the regular Council meeting, but was not reconvened.

____

Edward Lowry, Mayor

ATTEST:

____

Lenore P. Lancaster, Town Clerk

CERTIFICATION

I hereby certify that the foregoing minutes are a true and correct copy of the minutes of the Special Meeting of the Town Council of Paradise Valley held on the 18th day of December 2003. I further certify that the meeting was duly called and held and that a quorum was present.

Dated this _______ day of _______________, 2003.

____

Lenore P. Lancaster, Town Clerk

FULTER

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT.	DOCKET NO. W-01303A-05-

DIRECT TESTIMONY
OF
STACEY A. FULTER
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

DIRECT TESTIMONY
OF
STACEY A. FULTER
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

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I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND TELEPHONE NUMBER.

A. My name is Stacey A. Fulter and my business address is 303 H Street Suite 250, Chula Vista, CA 91910. My business telephone number is (619) 409-7708.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by American Water Works Service Company (Service Company) as an Intermediate Financial Analyst working for the Rates and Revenue Department in the Western Region of American Water.

Q. PLEASE BRIEFLY OUTLINE YOUR RESPONSIBILITIES?

A. I am responsible for the analysis and preparation of schedules and documentation for general rate applications for the Western Region companies. The Western Region consists of water and wastewater utilities located in Arizona, California, New Mexico, Hawaii, and Texas, including Arizona American Water Company. I am also responsible for the maintenance of reports and records within the Rate Department.

Q. BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I received a Bachelor of Science in Accounting in 1995 and a Master of Science in Accounting in 1997 from San Diego State University.

Q. HAVE YOU HAD ANY OTHER FORMAL TRAINING?

A. Yes, I have attended the NARUC Western Utility Rate Seminar in 1998, which covered the basics of utility ratemaking for regulated entities.

Q. HAVE YOU TESTIFIED BEFORE ANY REGULATORY AGENCIES?

A. Yes, I have previously provided written testimony for Paradise Valley Water Company and for California American Water.

II. GENERAL RATE CASE ISSUES

Q. WHAT ARE YOUR RESPONSIBILITIES IN THIS PROCEDING?

A. I am responsible for the coordination and review of the work product of the Shared Service associates, which gathered the various data in relation to expenses and revenues including the pro-forma adjustments. I am directly responsible for rate case expenses, General Office allocations, and pro-forma adjustments enumerated on Schedule C-2 relating to the Miller Road Treatment Facility.

A. REGULATORY EXPENSE

Q. WHAT IS THE REGULATORY EXPENSE ESTIMATE FOR THIS PARADISE VALLEY GENERAL RATE CASE APPLICATION?

A. For this rate application, I have estimated total rate case expense costs of $282,841.

Q. PLEASE LIST THE ITEMS AND AMOUNTS THAT COMPRISE THE $282,841 RATE CASE EXPENSE ESTIMATE.

A. The items and estimated amounts that comprise this estimate are as follows:

Outside Project Consultant	$14,500
Legal Fees	$36,000
AWW Shared Service	$77,049
Company Labor	$39,594
Company Expenses	$14,830
Cost of Capital	$79,383
Witness Training	$6,500
Rate Design Consultant	$4,995
Cost of Service Consultant	$9,990
Total Rate Case Expense	$282,841

Q. PLEASE EXPLAIN HOW RATE CASE EXPENSES WERE ESTIMATED.

A. The projected expense level for each expense category was determined based on the best available information. The costs of the outside project consultant, cost-of-capital consultants, rate design consultant, and cost-of-service consultant were all projected based on cost estimates received from each of those consultants. The outside project consultant's estimate is based on 116 hours at $125. The rate-design and cost-of-service consultant's hourly rate is $185 with 27 and 54 hours respectively.

The total cost estimate of $158,767 for the cost-of-capital consultant was reduced by fifty percent to $79,383. We retained the Brattle Group as our cost-of-capital consultants. We have included only fifty percent of the estimate so that the costs, as well as the benefit, of these services are shared equally by the Company's investors and ratepayers.

Witness-training expenses were estimated based on current costs for this type of programs. The most recent cost for this program is for ten participants for a total of $11,210. The estimated cost of $6,500 for Paradise Valley Water is based on fewer participants requiring training. The estimate from MJ Solutions for Witness Preparation is provided in the work papers.

Company labor expenses were estimated by multiplying each employee's hourly wage rate, effective April 1, 2005, with their working hours estimated for the Paradise Valley rate case. Total hours estimated for all six employees was 1,532 hours for a total labor estimate of $39,594. Company expenses were calculated based on a per-person, per-day amounts of $150 transportation, $150 hotel, $50 food, and $25 other expenses.

To reduce costs and litigation, the Company will not be using outside legal counsel in this case. Legal costs for our in-house counsel were estimated at $80 per hour and five 40-hour weeks of labor plus $20,000 for miscellaneous expenses.

Shared-service labor expenses were estimated by multiplying each employee's hourly wage rate, effective April 1, 2005, with their working hours estimated for the Paradise Valley rate case. Total hours estimated for all six employees was 474 hours for a total labor estimate of $72,949. Shared Service expenses were calculated based on per person, per day amounts of $700 transportation, $150 hotel, $50 food, and $25 other expenses.

Q WHY DID YOU INCLUDE COMPANY LABOR AND AWW SHARED SERVICES IN THE ESTIMATE OF RATE CASE EXPENSE?

A. Company labor is included in the estimate of rate case expense, so that costs to prepare and defend a rate case are appropriately included in each district. Previously, all time was allocated. Due to the number of active cases, it is necessary for AWW Shared Services to assist with various aspects of the case.

B. <u>ADJUSTMENTS FOR MILLER ROAD TREATMENT FACILITY</u>

Q. WHY IS THE COMPANY ADJUSTING RECORDED REVENUES AND OPERATION AND MAINTENANCE EXPENSES FOR MILLER ROAD TREATMENT FACILITY AS CONTAINED ON SCHEDULE C-2?

A. In 1994, trace amounts of a volatile organic compound called trichloroethylene (TCE) were detected in a groundwater monitoring well located just north of Chaparral Road in the City of Scottsdale. The Arizona Department of Environmental Quality (ADEQ) advised the Company that a plume of TCE was slowly migrating north, and was expected to reach the Company's well field, contaminating its wells.

To protect the Company's wells from contamination, the Company negotiated an agreement with the North Indian Bend Wash (NIBW) Participating Companies (Motorola, Siemens, and SmithKline Beecham) to build a treatment plant at no cost to the Company. The Participating Companies are also responsible for all costs related to the operation of the facility. The Miller Road Treatment Facility (MRTF) was completed in September, 1997 and its ownership transferred to the Company in December 1997. All costs are fully reimbursed by the Participating Companies with no expense or revenue to the Company or its customers. This method of treatment has been in place since the inception and was uncontested in Paradise Valley Water's previous rate case (Docket No. W-01303A-98-0507).

Q. WHAT ARE THE ADJUSTMENTS TO RECORDED REVENUES?

A. Note (A) 2 on Schedule C-2 reduces recorded revenues by $340,000 to exclude miscellaneous revenues associated with the Miller Road Treatment Facility. Additional adjustments to Operating Revenues are discussed in the testimony of Ralph Jordan.

Q. WHAT ARE THE ADJUSTMENTS TO RECORDED OPERATING AND MAINTENANCE EXPENSES?

A. Total Operating and Maintenance expenses for the Miller Road Treatment Facility were adjusted $245,999 and are explained in the testimony of David Weber.

C. <u>GENERAL OFFICE ALLOCATIONS</u>

Q. PLEASE EXPLAIN HOW GENERAL OFFICE COSTS WERE ALLOCATED TO THE DISTRICT?

A. General office costs were allocated to Paradise Valley using the 4-factor method. Using this method results in an 8.12% or $970,369 allocation of general office costs to Paradise Valley. The four-factor analysis considers many factors, all of which produce the benefits

Arizona American Water receives from the Service Company. This method was previously accepted in the Company's most recent general rate case (Docket No. WS-01303A-02-0867, et al).

Q. WHAT ARE THE COSTS INCLUDED IN THE GENERAL OFFICE ALLOCATION?

A. The costs categories that have been allocated include:

Labor
Group Insurance
Pensions
Management Fees
Insurance Other Than Group
Customer Accounting
Rents
General Office Expenses
Miscellaneous Expenses
Maintenance Expenses
Depreciation
General Taxes

Q. WHAT ADJUSTMENTS HAVE BEEN MADE TO CORPORATE OFFICE COSTS?

A. Corporate Office costs have been adjusted to include Group Insurance in the amount of $172,970 and Pensions in the amount of $38,948 that are associated with the Corporate Office employees.

Corporate Office costs have also been adjusted to exclude costs for employees that transferred to the Service Company. These adjustments include: Labor charges in the amount of $488,851, Group Insurance in the amount of $64,316 and Pension expenses in the amount of $14,186. In addition, an adjustment was made to exclude 401k and ESOP contributions in the amount of $16,328 and General Taxes in the amount of $38,167 for employees transferred to the Service Company. The total adjustment for employees transferred to the Service Company is $621,848.

An adjustment was made for pro-forma Management fees for the transferred employees in the amount of $228,356. Pro-forma management fees were derived by applying Arizona-American's General Office cost-allocation-factor of 36.7% to the adjustment total of $621,848 for employees transferred to the Service Company.

Q. WHAT OTHER ADJUSTMENTS HAVE BEEN MADE TO CORPORATE OFFICE COSTS?

A. Depreciation expense was adjusted $1,000,111 to remove the Citizens Acquisition Premium.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

JORDAN

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT.	DOCKET NO. W-01303A-05-

DIRECT TESTIMONY
OF
RALPH A. JORDAN
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

DIRECT TESTIMONY
OF
RALPH A. JORDAN
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
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I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Ralph A. Jordan and my business address is 3906 Church Road, Mount Laurel, NJ 08054.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by American Water Shared Services Center ("SSC") as a Financial Analyst in the Rates and Regulation Department. The SSC is an at-cost service provider to the operations of the American Water system.

Q. PLEASE BRIEFLY OUTLINE YOUR RESPONSIBILITIES AS A FINANCIAL ANALYST.

A. As Financial Analyst, I am responsible for preparing work papers and exhibits in support of rate applications on behalf of the operating subsidiaries in the American Water System.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I am currently pursuing a Bachelor of Science Degree in Finance at Rutgers University.

Q. HAVE YOU HAD ANY OTHER FORMAL TRAINING?

A. I have also attended the NARUC Utility Rate School.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

A. From June 1990 until December 1996 I was employed by Policy Management Systems Corporation in Mt. Laurel, NJ as Territory and Branch Manager. I began my employment with New Jersey-American Water Company (an American Water subsidiary) as a Senior Business Clerk in April 1997. On September 4, 2001 I was promoted to Financial Specialist and transferred to the SSC. On April 1, 2004 I was promoted to my present position as Financial Analyst.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to support the development of revenues for Arizona American Water at present rates including the adjustment to the Paradise Valley Country Club. Present rate revenues do not include any applicable taxes or surcharges. I am sponsoring Schedules E-7 and C-2, and related supporting work papers.

II. TEST YEAR REVENUE ADJUSTMENTS

Q. PLEASE EXPLAIN ADJUSTMENT A-1 ON SCHEDULE C-2.

A. Adjustment A-1 normalizes revenues to reflect an increase of 13 new residential customers in the test year. Normalized residential revenue was calculated by multiplying the average monthly residential bill of $50.17 by the number of new customers (13), and multiplying that amount by 6 to reflect the average test year duration of new customers. The resulting volumetric residential normalization is $3,913.26. The 5/8 inch meter charge of $8.41 is then multiplied by the number of new customers, and then by 6, to arrive at normalized residential metered revenue of $655.98. Normalized residential revenue during the test year is $4,569.24.

Q. PLEASE EXPLAIN ADJUSTMENT A-2 ON SCHEDULE C-2.

A. Adjustment A-2 removes Other Revenues of $340,000 associated with the Miller Road Treatment Facility. Miller Road Treatment Facility adjustments are explained in the testimony of Stacey A. Fulter.

Q. PLEASE EXPLAIN ADJUSTMENT A-3 SHOWN ON SCHEDULE C-2.

A. Adjustment A-3 adjusts test year revenues by negative ($46,767) to remove unbilled revenues.

Q. PLEASE EXPLAIN ADJUSTMENT A-4 SHOWN ON SCHEDULE C-2.

A. Adjustment A-4 increases test year revenues to reflect 2004 Paradise Valley Country Club excess usage, which was billed in 2005. The annual base is 574.08 acre-feet. 2004 Country club usage was 203,063 thousand gallons, or 623.20 acre-feet, an excess over base of 49.12 acre-feet. This excess was then multiplied by the 2005 acre-foot commodity charge of $271.39 to arrive at an adjustment to Commercial revenue of $13,330.68. The monthly Service Charge for 2004 was $248.64 and the monthly service charge is for 2005 is $256.84, resulting in a difference of $8.20. On an annual basis, the service charge difference is $98.20, which, when added to the commodity charge adjustment of $13,330.68, results in a total adjustment at present rates of $13,429.08. Please see WKPR – 3 for the calculation.

Q. PLEASE EXPLAIN ADJUSTMENT A-5 SHOWN ON SCHEDULE C-2.

A. Adjustment A-5 on Schedule C-2 increases test year revenues to correct an error in the second block of rate schedule P1M1A. Rate Schedule P1M1A's second volumetric rate block range is currently 26-80 thousand gallons. However, P1M1A was incorrectly set-up to *add* 80 to the second block rather than crest at 80, for a total range of 26-105. As a result, greater usage was allocated to the second block and less usage was allocated to the third block. This error was in effect for the 2004 revenue months of January through April, and was corrected for the May billing.

From January to April, 27,869.01 thousand gallons were over-allocated to the second block and under-allocated to the third block. Total actual revenue for rate schedule P1M1A for January through April was subtracted from the corrected revenue for rate schedule P1M1A for that period using the appropriate volumetric rate blocks to arrive at a test year revenue adjustment of $13,655.79.

Q. PLEASE EXPLAIN ADJUSTMENT A-6 SHOWN ON SCHEDULE C-2.

A. Residential revenues are adjusted $3,509 to reflect Mummy Mountain residential customers on Paradise Valley's current three-block rate structure. Volumetric revenues are decreased $3,378 and Service Charge revenues are increased $6,887 for a net increase in revenues of $3,509.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes it does.

WEBER

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

JEFF HATCH-MILLER, Chairman
WILLIAM A. MUNDELL
MARC SPITZER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION OF ARIZONA-AMERICAN WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES BASED THEREON FOR UTILITY SERVICE BY ITS PARADISE VALLEY WATER DISTRICT.	DOCKET NO. W-01303A-05-

DIRECT TESTIMONY
OF
DAVID L. WEBER
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

DIRECT TESTIMONY
OF
DAVID L. WEBER
ON BEHALF OF
ARIZONA AMERICAN WATER COMPANY
JUNE 3, 2005

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I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is David L. Weber and my business address is 3906 Church Road, Mount Laurel, NJ 08054.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by American Water Shared Services Center ("SSC") as a Senior Financial Analyst in the Rates and Regulation Department. The SSC is an at-cost service provider to the operations of the American Water system.

Q. PLEASE BRIEFLY OUTLINE YOUR RESPONSIBILITIES AS A SENIOR FINANCIAL ANALYST.

A. As a Senior Financial Analyst, I am responsible for preparing testimony, exhibits, and work-papers in support of rate applications on behalf of the operating subsidiaries in the American Water System.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I received a Bachelor of Arts degree in Accounting from Cedarville University in 1992 and a Master of Business Administration degree in Finance from Drexel University in 2000. In March 2004, I began studying toward a Doctor of Business Administration degree in Accounting at Anderson University.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

A. From July 1992 to April 1994 I was employed as an Accountant by the public accounting firms of George S. Olive & Co and Brandy, Ware, & Schoenfeld, Inc. in Richmond, Indiana. In May 1994, I began employment in the American Water System as an Accountant at New Jersey-American Water Company (NJAWC) in Haddon Heights, New Jersey. In July 1995, I was promoted to Senior Accountant and in January 1997 to Senior Financial Analyst. In that position at NJAWC I was responsible for preparing work papers and exhibits for rate applications. In May 1999, I transferred to the American Water corporate office in Voorhees, New Jersey, where I was responsible for various financial-analysis and cash-management duties. In August 2001, I transferred to the SSC, where I assumed my present responsibilities.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to support Schedules C and E in this general rate case application as required by A.A.C. R14-2-103 for Class A Water Utilities. My testimony will focus primarily on certain pro-forma adjustments enumerated on Schedule C-2. The adjustments I am supporting on Schedule C-2 are Operating Revenues and Operations and Maintenance Expenses, and Payroll Taxes.

II. ADJUSTMENTS TO OPERATIONS EXPENSE

Q. PLEASE EXPLAIN THE PREMISE FOR THE $225,395 ADJUSTMENT TO OPERATIONS EXPENSE CONTAINED IN NOTE (B) ON SCHEDULE C-2.

A. The adjustment is to annualize and normalize various Operations Expenses in the test year for known and measurable changes, exclude expenses that should not be borne by the ratepayer, and include proposed new costs and charges.

Q. PLEASE BREIEFLY DESCRIBE WHAT WOULD CONSTITUTE KNOWN AND MEASURABLE CHANGES.

A. Known and measurable changes are activities or costs incurred by the Company not included in the recorded test year yet there is a high degree of certainty the activity or cost will occur and the amount known.

Q. PLEASE DESCRIBE THE OPERATING EXPENSE ADJUSTMENTS MADE ON SCHEDULE C-2.

A. The operating expense adjustments, totaling $225,395 follow in the numerical order that they appear on Note (B) of Schedule C-2:

1) The adjustment of ($74,193) was made to exclude the test year operating expenses relating to the Miller Road Treatment Facility. This matches the adjustment made by

Mr. Jordan to remove $340,000 in revenue associated with that facility. Ms. Stacey A. Fulter explains the reasons for the Miller Road Treatment Facility adjustments.

2) The adjustment of ($140,651) was made to normalize purchased power costs and to reclassify Miller Road Treatment Facility purchased power costs posted to the general ledger. The amount of ($5,783) is due to the normalization of power costs based on power bills received for the twelve months of March 2004 to February 2005. The amount of ($134,868) is due to the reclassification of Miller Road Treatment Facility power costs based on approximately 23% of the production from the applicable wells.

3) The adjustment of $1,616 was made to normalize office lease costs for office space located at 7500 East McDonald Drive, Scottsdale, AZ, leased from Dan Madison & Co, Inc. The normalized costs include an increase of contractual base rent from $3,376.75 effective 08/04/03 – 08/03/04 to $3,420.04 effective 08/04/04 – 08/03/05 and the Company's contractual share of 9.66% of the increase in building operational expenses for 2005. A copy of the lease contract and the lessor's estimation of 2005 building operating costs are shown in work paper #2 and work paper #3, respectively.

4) The adjustment of $18,241 was made to reclassify office-lease costs that were erroneously capitalized in the test year to operating expense.

5) The adjustment of $200,566 was made to allocate and normalize group insurance expense relative to the proposed level of employees and payroll rates, net of the expenses associated with the employees working at the Miller Road Treatment Facility. The normalized group insurance expense was based upon the Company's portion of health and life insurance costs relative to salaries and wages effective April 1, 2005, reduced by a projected capitalized portion. Group insurance expense is recorded for book purposes at a corporate level and must be allocated to each district for ratemaking purposes.

6) The adjustment of $62,478 was made to include normalized OPEB expense. The normalized expense includes the Company's portion of costs related to retiree health insurance plus amortization of deferred costs, reduced by a projected capitalized portion. These costs, like those for group insurance, are recorded for book purposes at the corporate level and must be allocated to each district for ratemaking purposes.

7) The adjustment of $94,280 was made to include amortization of rate case expense based on the costs of preparation and presentation of this case. Ms. Fulter also discusses rate-case costs.

8) The adjustment of $35,409 was made to include normalized pension expense. The adjustment was calculated by dividing the projected year pension funding costs of $296,624 by the 115 employee participants, resulting in a $2,579 funding cost per

participant. The $2,579 cost was multiplied 14.1702 full-time equivalent employees who worked at Paradise Valley in the test year, excluding time for work at Miller Road Treatment Facility. The result was a $36,550 normalized pension cost. This cost was reduced by a projected capitalized portion of $2,778, resulting in a projected normalized pension expense of $33,772. Comparing the $33,772 normalize expense to ($1,637) posted in the test year resulted in the adjustment of $35,409.

9) The adjustment of $33,552 was made to include the cost of writing-off the balance of the Company's materials and supplies inventory not posted to the general ledger.

10) The adjustment of $(22,368) was made to normalize the cost of writing-off the Company's materials and supplies inventory based upon a 36-month amortization period.

11) The adjustment of $82,306 was made to normalize operations labor based on actual wage increases that became effective April 1, 2005, at a full level of employees, excluding any projected time spent working at the Miller Road Treatment Facility. The projected time spent working at the Miller Road Treatment Facility was based upon the recorded percentage of time spent working at the facility in the test year for each employee. The total normalized payroll costs are projected to be $596,596. This total is comprised of $508,684 related to regular time, $42,534 related to overtime

work, $41,436 related to capital work at regular rates, and $3,942 related to capital work at overtime rates.

The normalized regular time cost of $508,684 was calculated by multiplying each employee's hourly wage rate, effective April 1, 2005, by 2080 hours (40 hours per week x 52 weeks) by the percentage of time the employee spent working for Paradise Valley in the test year and subtracting from the result a projected amount of normalized capital labor. The amount of normalized capital labor at regular rates of $41,436 was projected by increasing the test year total capital labor of $43,843 by an estimated wage increase amount of 3.50%, and subtracting projected capital labor at overtime rates of $3,942. The amount of normalized overtime labor of $42,534 was projected by increasing the test year overtime labor of $41,096 by an estimated wage increase amount of 3.50%. The amount of normalized capital labor at overtime rates of $3,942 was projected by increasing the test year capital labor at overtime rates of $3,808 by an estimated wage increase amount of 3.50%.

The $508,684 of projected normalized labor at regular rates and the $42,534 of overtime work were added to derive projected normalized payroll expense of $551,219. The projected normalized payroll expense was allocated $403,163 to Operations Labor and $148,056 to Maintenance Labor by using 73.14% for operations and 26.86% for maintenance, which was derived from the latest three calendar-year average. Comparing the $403,163 and $148,056 of projected normalized labor expense for operations and maintenance to the test year expense of $320,857 and $95,760 for operations and maintenance, respectively, excluding all work associated with the Miller Road Treatment Facility, resulted in an adjustment of $82,306 for Operations Labor Expense and $52,296 for Maintenance Labor Expense.

12) The adjustment of ($65,841) was made to exclude the test year operating labor expenses associated with the Miller Road Treatment Facility.

III. ADJUSTMENTS TO MAINTENANCE EXPENSE

Q. PLEASE EXPLAIN THE ADJUSTMENTS MADE TO MAINTENANCE EXPENSE IN SCHEDULE C-2, NOTE (C).

A. As is the case with the adjustments made to Operations Expense, the adjustments to Maintenance Expense pertain primarily to the annualizing and normalizing of various maintenance expenses in the test year for known-and-measurable changes. The adjustments made to Maintenance Expense, totaling ($48,651), follow in number order that they appear on Note (C) of Schedule C-2.

1) The adjustment of ($100,772) was made to exclude the test-year maintenance expenses associated with the Miller Road Treatment Facility included in the general ledger.

2) The adjustment of $52,296 was made to normalize maintenance labor based on actual wage increases that became effective April 1, 2005. See the explanation related to the adjustment to normalize operations labor for an explanation of the adjustment to normalize maintenance labor.

3) The adjustment of ($175) was made to exclude the test year operating labor expenses associated with the Miller Road Treatment Facility included in the general ledger.

IV. OTHER INCOME STATEMENT ADJUSTMENTS

Q. PLEASE EXPLAIN THE ADJUSTMENT MADE TO DEPRECIATION EXPENSE IN NOTE (D) OF SCHEDULE C-2.

A. The adjustment of ($60,527) made to Depreciation Expense is discussed in the testimony of David P. Stephenson.

Q. PLEASE EXPLAIN THE ADJUSTMENTS MADE TO PROPERTY TAX EXPENSE IN NOTE (E) OF SCHEDULE C-2.

A. The adjustment made to Property Tax Expense, totaling ($14,879), is discussed in the testimony of David P. Stephenson.

Q. PLEASE EXPLAIN THE ADJUSTMENTS MADE TO PAYROLL TAX EXPENSE IN NOTE (F) OF SCHEDULE C-2.

A. The adjustments made to Payroll Tax Expense, totaling $3,818, follow in number order that they appear on Note (F) of Schedule C-2:

1) The adjustment of $8,836 was made to normalize payroll tax expense based on actual payroll wages and salaries that became effective April 1, 2005, excluding labor related to the Miller Road Treatment Facility.

2) The adjustment of ($5,018) was made to exclude the test year payroll tax expense associated with the Miller Road Treatment Facility included in the general ledger.

Q. PLEASE EXPLAIN THE ADJUSTMENT MADE TO STATE AND FEDERAL INCOME TAXES IN NOTE (G) OF SCHEDULE C-2.

A. The adjustment to state and federal income taxes is discussed in the testimony of David P. Stephenson.

Q. PLEASE EXPLAIN THE ADJUSTMENT MADE TO INTEREST EXPENSE IN NOTE (G) OF SCHEDULE C-2.

A. The adjustment to interest expense is discussed in the testimony of David P. Stephenson.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

BOURASSA

A SCHEDULES

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPUTATION OF INCREASE IN GROSS REVENUE REQUIREMENT
Test Year 12 Months Ended December, 2004

Line No.	DESCRIPTION	Original Cost		The Company is not requesting RCND
1.	Adjusted Rate Base	$ 11,651,216 (a)		n/a
2.	Adjusted Operating Income	$ 742,769 (b)		n/a
3.	Current Rate Of Return	6.38%		n/a
4.	Required Operating Income	$ 913,455		n/a
5.	Required Rate Of Return	7.84%		n/a
6.	Operating Income Deficiency (Ln 4 - Ln 2)		$ 170,686	
7.	Gross Revenue Conversion Factor		1.6286 (c)	
8.	Increase in Gross Revenue Requirements (Line 6 x Line 7)		$ 277,980	

	CUSTOMER CLASSIFICATION	Projected Revenue Increase	% Dollar Increase
9.	Residential		
10.	Commercial		
11.	PV Country Club		
12.	Turf Related		
13.	Fire Service		
14.	Public Authority		
15.	Sales For Resale		
16.	Miscellaneous		
17.	Other		
18.	Total	$ 277,980	5.48%

Supporting Schedules: (a) B-1, (b) C-1, (c) C-3

Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
SUMMARY RESULTS OF OPERATION
Two Prior Years And Test Year

Line No.	DESCRIPTION	Prior Years at 12/31/02 (a)	Prior Years at Dec. 2003 (a)	Test Year Dec. 2004 Actual (a)	Test Year Dec. 2004 Adjusted (b)	Projected Year at Dec. 2005 Present Rates (c)	Projected Year at Dec. 2005 Proposed Rates (c)
1.	Gross Revenues	$ 5,680,804	$ 5,815,830	$ 5,422,284	$ 5,070,680	$ 5,070,680	$ 5,348,660
2.	Revenue Deductions & Operating Expenses	4,920,339	4,835,264	4,347,108	4,327,912	4,327,912	4,435,209
3.	Operating Income	$ 760,465	$ 980,566	$ 1,075,176	$ 742,769	$ 742,769	$ 913,452
4.	*Other Income and* Deductions	104,540	39,218	66,439	-	-	-
5.	Interest Expense	495,236	507,326	534,228	399,637	399,637	399,637
6.	Net Income	$ 369,770	$ 512,457	$ 607,386	$ 343,132	$ 343,132	$ 513,815
7.	Earned per Average Common Share	$ 2.23	$ 3.08	$ 3.66	$ 2.07	$ 2.07	$ 3.09
8.	Dividends per Common Share	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00
9.	Payout Ratio	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10.	Return on Average Invested Capital	6.53%	8.42%	9.23%	6.38%	6.38%	7.84%
11.	Return on Year End Capital	6.53%	8.42%	9.23%	6.38%	6.38%	7.84%
12.	Return on Averge Common Equity	8.30%	11.62%	14.19%	8.02%	8.02%	12.01%
13.	Return on Year End Common Equity	8.30%	11.62%	14.19%	8.02%	8.02%	12.01%
14.	Times Bond Interest Earned - Before Income Taxes	1.06	1.60	1.77	1.40	1.40	2.09
15.	Times Total Interest & Perferred Dividends Earned-After Taxes	1.08	1.60	1.77	1.40	1.40	2.09

Supporting Schedules: (a) E-2 (b) C-1 (c) F-1

Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
SUMMARY CAPITAL STRUCTURE
Two Prior Years, Test Year and Projected Year

Line No.	DESCRIPTION	Prior Years at 12/31/02 (a)	Prior Years at Dec. 2003 (a)	Test Year at Dec. 2004 (a)	Projected at Dec. 2005 (b)
1.	Short-Term Debt	$ 12,517,323	$ 15,429,146	$ -	$ -
2.	Long-Term Debt	173,817,457	173,803,348	198,791,428	217,781,428
3.	TOTAL DEBT	$ 186,334,780	$ 189,232,494	$ 198,791,428	$ 217,781,428
4.	Preferred Stock	-	-	-	
5.	Common Equity	115,437,405	115,315,673	115,410,356	126,420,356
6.	TOTAL CAPITAL	$ 301,772,185	$ 304,548,167	$ 314,201,784	$ 344,201,784
	CAPITALIZATION RATIOS				
7.	Short-Term Debt	4.15 %	5.07 %	0.00 %	0.00 %
8.	Long-Term Debt	57.60	57.07	63.27	63.27
9.	TOTAL DEBT	61.75 %	62.14 %	63.27 %	63.27 %
10.	Preferred Stock	0.00 %	0.00 %	0.00 %	0.00 %
11.	Common Equity	38.25	37.86	36.73	36.73
		100.00 %	100.00 %	100.00 %	100.00 %
12.	Weighted Cost of Short-Term Debt	0.00 %	0.00 %	0.00 %	0.00 %
13.	Weighted Cost of Long-Term Debt	0.00 %	0.00 %	3.43 %	3.45 %
14.	Weighted Cost of Equity	0.00 %	0.00 %	4.41 %	4.41 %

Supporting Schedules: (a) E-1, (b) D-1

Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
EXPENDITURES AND GROSS UTILITY PLANT IN SERVICE
Two Prior Years, Test Year, And Three Projected Years

Line No.	YEAR	Construction Expenditures (a)	Net Plant Placed In Service (b)	Year End Gross Utility Plant In Service
1.	Year Ended December 31, 2002	691,386	1,966,138	31,075,999
2.	Year Ended December, 2003	360,640	(1,210,352)	29,865,646
3.	Test Year Ended December, 2004	4,032,377	(460,740)	29,404,906
4.	Projected Year Ended December, 2005	13,868,312	13,868,312	43,273,218
5.	Projected Year Ended December, 2006	10,613,819	10,613,819	53,887,037
6.	Projected Year Ended December, 2007	3,990,839	3,990,839	57,877,876

Supporting Schedules: (a) F-3, (b) E-5

Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
SUMMARY CHANGES IN FINANCIAL POSITION
Two Prior Years, Test Year And Projected Year

Line No.	DESCRIPTION	Prior Years at 12/31/02 (a)	Prior Years at Dec. 2003 (a)	Test Year at Dec. 2004 (a)	Projected Year at Dec. 2005 Present Rates (b)	Projected Year at Dec. 2005 Proposed Rates (b)
	Source of Funds					
1.	Operation	$ (1,194,241)	$ 6,094,490	$ (4,467,331)	$ 87,901	$ 130,573
2.	Outside Financing	1,878,658	(5,539,752)	8,689,936	13,801,375	13,758,703
3.	Other	-	-	-	-	-
4.	Total Funds Provided	$ 684,417	$ 554,738	$ 4,222,605	$ 13,889,276	$ 13,889,276
	Application of Funds					
5.	Construction Expenditures	$ 691,386	$ 360,640	$ 4,032,377	$ 13,868,312	$ 13,868,312
6.	Outside Financing	-	-	-	-	-
7.	Other	(6,968)	194,099	190,229	20,964	20,964
8.	Total Funds Applied	$ 684,418	$ 554,739	$ 4,222,606	$ 13,889,276	$ 13,889,276

Supporting Schedules: (a) E-3, (b) F-2

Recap Schedules:

B SCHEDULES

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISITRICT
SUMMARY OF ORIGINAL COST AND RCND RATE BASE ELEMENTS
Test Year 12 Months December, 2004

Line No.	DESCRIPTION	Original Cost Rate Base *		RCND Rate Base *	
1.	Gross Utility Plant in Service	$ 29,478,687		$ -	
2.	Reg Asset - AFUDC Debt	950		-	
3.	Construction Work In Progress	-		-	
4.	Less: Accumulated Depreciation	9,913,869		-	
5.	Net Utility Plant In Service	$ 19,565,769	(a)	$ -	(b)
	Less:				
6.	Customers' Advances for Construction (Adj TY)	635,912			
7.	Contributions in Aid of Construction (Adj TY)	6,486,559			
8.	Deferred Taxes	1,139,528			
9.	Deferred Pension Costs Net of Taxes	-		-	
10.	Customer Deposits	3,500		-	
	Add:				
11.	Allowance for Working Capital	350,946	(c)	-	(c)
12.	Total Rate Base	$ 11,651,216	(d)	$ -	(d)

* Including proforma adjustments

Supporting Schedules: (a) B-2, (b) B-3, (c) B-5

Recap Schedules: (d) A-1

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
ORIGINAL COST RATE BASE PROFORMA ADJUSTMENTS
Test Year 12 Months Ended December, 2004

Line No.	DESCRIPTION	Actual at End of Test Year (a)	Proforma Adjustments	Adjusted at End of Test Year (b)
1.	Gross Utility Plant in Service	$ 29,404,906	(1) $ 73,781	$ 29,478,687
2.	Net Reg Asset - AFUDC Debt	950		950
3.	Construction Work In Progress	3,646,198	(2) $ (3,646,198)	-
4.	Less: Accumulated Depreciation	9,883,836	(3) $ 30,033	9,913,869
5.	Net Utility Plant In Service	$ 23,168,218	$ (3,602,449)	$ 19,565,769
	Less:			
6.	Customers' Advances for Construction (Adj TY)	635,912		635,912
7.	Contributions in Aid of Construction (Adj TY)	6,486,559		6,486,559
8.	Deferred Taxes	1,139,528		1,139,528
9.	Deferred Pension Costs Net of Taxes	-		-
10.	Customer Deposits	3,500		3,500
	Add:			
11.	Allowance for Working Capital	350,946		350,946
12.	Total	15,253,666	(3,602,449)	11,651,216

13. (1) Corporate Division and Central Division Corporate District plant allocation.
14. (2) Adjustment to remove CWIP from net UPIS.
15. (3) Accumulatd depr. related to adjustment 3

Supporting Schedules: (a) E-1

Recap Schedules: (b) B-1

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
RCND RATE BASE PROFORMA ADJUSTMENTS
Test Year 12 Months Ended December, 2004
THE COMPANY IS NOT REQUESTING RCND IN THIS CASE

Line No.	DESCRIPTION	Actual at End of Test Year (a)	Proforma Adjustments	Adjusted at End of Test Year (b)
1.	Gross Utility Plant in Service	$ -	$	$ -
2.	Net Reg Asset - AFUDC Debt	-	-	-
3.	Construction Work In Progress	-	-	-
4.	Less: Accumulated Depreciation	-	-	-
5.	Net Utility Plant In Service	$ -	$ -	$ -

Supporting Schedules: (a) B-4

Recap Schedules: (b) B-1

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
RCND BY MAJOR PLANT ACCOUNTS
AS OF December, 2004

THE COMPANY IS NOT REQUESTING RCND IN THIS CASE

Line No.	Old Acct. No.	New Acct. No.	DESCRIPTION	RCN	Condition Percent	RCND
			WATER PLANT			
1.	105	103000.000000	Property Held For Future Use	$ -	$ -	$ -
2.	301	101000.301000	Organization	-	-	-
3.	304.0		Miscellaneous Intangible Plant Studies	-	-	-
4.	310.2	101000.303200	Reservoir Land	-	-	-
5.	320	101000.303300	Pumping Land & Land Rights	-	-	-
6.	330	101000.303400	WT Land & Land Rights	-	-	-
7.	340.2	101000.303500	Dist. Res. & Standpipe Land	-	-	-
8.	389.1	101000.303600	Office Land	-	-	-
9.	311	101000.304100	SS Structures & Improvements	-	-	-
10.	314	101000.307000	Wells & Springs	-	-	-
11.	321	101000.304200	Pumping Structures & Improve	-	-	-
12.	325	101000.311200	Elec Pumping Equipment	-	-	-
13.	326	101000.311300	Diesel Pumping Equipment	-	-	-
14.	331	101000.304300	WT Structures & Improvements	-	-	-
15.	332	101000.320100	Water Treatment Equipment	-	-	-
16.	341	101000.304400	Grit Removal Equipment	-	-	-
17.	342	101000.330001	Dist. Reservoirs & Standpipes	-	-	-
18.	343.1	101000.331100	T & D Mains - 4" & Less	-	-	-
19.	343.2	101000.331200	T & D Mains - 6" - 8"	-	-	-
20.	343.3	101000.331300	T & D Mains - 10" or More	-	-	-
21.	345.1	101000.333000	Services	-	-	-
22.	346	101000.334100	Meters	-	-	-
23.	347	101000.334200	Meter Installations	-	-	-
24.	348	101000.335000	Hydrants	-	-	-
25.	349	101000.339000	Other T & D Plant	-	-	-
26.	390.2	101000.304700	Stores Shop & Gar. Structures	-	-	-
27.	390.6	101000.304610	Heating & Air Conditioning	-	-	-
28.	391.1	101000.340100	Office Furniture	-	-	-
29.	391.21	101000.340200	Computers & Peripherals	-	-	-
30.	391.22	101000.340300	Computer Software	-	-	-
31.	391.3	101000.340500	Other Office Equipment	-	-	-
32.	392.11	101000.341100	Trans. Equip. - Light Trucks	-	-	-
33.	392.2	101000.341300	Trans. Equip. - Automobiles	-	-	-
34.	392.3	101000.341400	Trans. Equip. - Other	-	-	-
35.	394	101000.343000	Tools Shop & Garage Equipment	-	-	-
36.	396	101000.345000	Power Operated Equipment	-	-	-
37.	397	101000.346100	Communication Equipment	-	-	-
38.	398	101000.347000	Miscellaneous Equipment	-	-	-
39.			TOTAL PLANT IN SERVICE (a)	$ -	$ -	$ -

Percent Condition is calculated based on RCND factors.

Supporting Schedules:

Recap Schedules: (a) B-3

ARIZONA-AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPUTATION OF WORKING CAPITAL
Test Year 12 Months Ended December, 2004

Line No.	DESCRIPTION	Amount	
1.	CASH WORKING CAPITAL		
2.	Materials and Supplies	$ -	(a)
3.	Prepayments	-	(a)
4.	Deferred Debits[1]	182,814	(a)
5.	Working Cash[2]	168,133	
6.	Total Working Capital Requirements	$ 350,946	(b)

Supporting Schedules: (a) E-1 Recap Schedules: (b) B-1

Notes: [1] Def. Vac. Pay, Curr. State Def. Tax, & Curr Fed. Def. Tax not included in Deferred Debits.
[2] Working cash based on lead/lag study

C SCHEDULES

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
ADJUSTED TEST YEAR INCOME STATEMENT
Test Year 2004

Line No.	DESCRIPTION		(a) Actual Test Year		(b) Proforma Adjustments	Reference		Adjusted Test Year
1.	OPERATING REVENUES	$	5,422,284		($351,604)	A	$	5,070,680
2.	OPERATING EXPENSES							
3.	Operations	$	2,601,346		225,395	B	$	2,826,742
4.	Maintenance		345,581		(48,651)	C		296,930
5.	Depreciation		781,105		(60,527)	D		720,578
6.	TAXES							
7.	Property Tax		228,120		(14,879)	E		213,241
8.	Payroll		50,898		3,818	F		54,716
9.	State Income		61,388		(22,449)	G		38,940
10.	Federal Income		278,670		(101,905)	G		176,765
11.	TOTAL OPERATING EXPENSES	$	4,347,108	$	(19,197)		$	4,327,912
12.	OPERATING INCOME	$	1,075,176	$	(332,407)		$	742,769
13.	OTHER INCOME							
14.	AFUDC		66,439		(66,439)	(H)		-
15.	Misc. Other Income		-					-
16.	Misc. Other Deductions		-					-
17.	Taxes on Other Income		-					-
18.	TOTAL OTHER INCOME	$	66,439	$	(66,439)		$	-
19.	GROSS INCOME	$	1,141,615	$	(398,846)		$	742,769
20.	INCOME DEDUCTIONS							
21.	Interest Expense		534,228		(134,592)	(I)		399,637
22.	NET INCOME	$	607,386		(264,254)			343,132

Supporting Schedules: (a) E-2, (b) C-2

Recap Schedules: (c) A-1

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
INCOME STATEMENT PROFORMA ADJUSTMENTS
Test Year 12 Months Ended December, 2004

NOTE		DESCRIPTION	TOTAL ADJUSTMENTS (a)
(A)	1)	Adjustment to normalize revenues by annualizing the consumption of the new customers partially active during the test year.	$4,569
	2)	Adjustment to reduce and exclude Other Revenues associated with the Miller Road Treatment Facility.	($340,000)
	3)	Adjustment to remove unbilled revenue	($46,767)
	4)	Adjustment to increase revenues for P.V. Country Club '04 excess usage billed in '05.	$13,429
	5)	Adjustment to correct error in 2nd volumetric block usage	$13,656
	6)	Adjustment to combine Mummy Mountain to three block structure	$3,509
		Total for Note (A)	($351,604)
(B)	1)	Adjustment to exclude Miller Road Treatment Facility operating expenses included in general ledger	($74,193)
	2)	Adjustment to normalize purchased power	(140,651)
	3)	Adjustment to normalize office lease expenses	1,616
	4)	Adjustment to reclassify office lease expenses	18,241
	5)	Adjustment to normalize group insurance expense based on current group insurance premiums.	200,566
	6)	Adjustment to include normalized OPEB expense not posted to general ledger.	62,478
	7)	Adjustment to normalize amortization of rate case expense based on projected deferred rate case costs.	94,280
	8)	Adjustment to include pension expense not posted to general ledger.	35,409
	9)	Adjustment to reclassify expense associated with write-off of materials and supplies inventory not posted to general ledger.	33,552
	10)	Adjustment to normalize amortization of write-off of materials and supplies inventory.	(22,368)
		Sub-Total Operations Expense Adjustments	$208,930
	11)	Adjustment to normalize Operations Labor	82,306
	12)	Adjustment to exclude Miller Road Treatment Facility operating labor included in general ledger	(65,841)
		Total Operations Expense Adjustment (Note B)	$225,395

(C)	1)	Adjustment to exclude Miller Road Treatment Facility maintenance expenses included in general ledger	(100,772)
		Sub-Total Maintenance Expense Adjustment	($100,772)
	2)	Adjustment to Normalize Maintenance Labor	$52,296
	3)	Adjustment to exclude Miller Road Treatment Facility maintenance labor included in general ledger	($175)
		Total Maintenance Expense Adjustment (C)	($48,651)
(D)	1)	Depreciation expense adjustment based on adjusted utility plant in service and contributions.	(60,527)
(E)	1)	Adjustment to normalize property taxes.	(14,879)
		Total General Tax Expense Adjustment (E)	(14,879)
(F)	1)	Adjustment to normalize payroll taxes based on revised payroll rates & salaries effective April 1, 2005.	8,836
	2)	Adjustment to exclude Miller Road Treatment Facility payroll tax expense included in general ledger	(5,018)
		Total Payroll Tax Expense Adjustment (F)	$3,818
(G)	1)	Adjustment to State Income Taxes to reflect all adjustments included in application.	(22,449)
	2)	Adjustment to Federal Income Taxes to reflect all adjustments included in application.	(101,905)
(H)	1)	Adjustment to remove AFUDC earnings to reflect removal of construction work in progress from rate base.	(66,439)
(I)	1)	Adjustment to reflect synchronized interest expense.	(134,592)
		Total All Adjustments	($586,710)

Supporting Schedules: Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPUTATION OF GROSS REVENUE CONVERSION FACTOR

Line No.	DESCRIPTION	PRESENT PERCENTAGE OF INCREMENTAL GROSS REVENUE	PROPOSED PERCENTAGE OF INCREMENTAL GROSS REVENUE
1.	Federal Income Taxes	31.63%	31.63%
2.	State Income Taxes	6.97%	6.97%
3.	Other Taxes and Expenses		
	Uncollectibles	0.00%	0.00%
4.	Total Tax Percentage	38.60%	38.60%

1)	Operating Income %	61.40
	Gross Revenue Coversion Factor:	
a)	One Hundred	100
b)	Operating Income Percent (1 Above)	61.40
c)	Revenue Conversion Factor (a / b)	1.6286

Supporting Schedules:

Recap Schedules: A-1

D SCHEDULES

ARIZONA AMERICAN WATER COMPANY
SUMMARY COST OF CAPITAL
Test Year and Projected Year

Line No.	INVESTED CAPITAL	End of Test Year December 2004				Projected Year at December 2005			
		Amount	%	Cost Rate(e)	Composite Cost	Amount	%	Cost Rate(e)	Composite Cost
1.	Long-Term Debt (a)	$ 198,791,428	63.3%	5.42%	3.43%	$ 217,781,428	63.3%	5.45%	3.45%
2.	Preferred Stock (b)	-	0.0%	0.00%	0.00%	-	0.0%	0.00%	0.00%
3.	Common Equity (c)	115,410,356	36.7%	12.00%	4.41%	126,420,356	36.7%	12.00%	4.41%
4.	Short-Term Debt (d)	-	0.0%	0.00%	0.00%	-	0.0%	0.00%	0.00%
5.	Deferrals (e)	-	0.0%	0.00%	0.00%	-	0.0%	0.00%	0.00%
		$ 314,201,784	100.0%		7.84%	$ 344,201,784	100.0%		7.86%

Supporting Schedules: (a) D-2, (b) D-3, (c) D-4, (d) E-1

Recap Schedules: (c) A-3

ARIZONA AMERICAN WATER COMPANY
COST OF LONG-TERM AND SHORT TERM DEBT
Test Year and Projected Year

Line No.	INVESTED CAPITAL	End of Test Year December 2004 Outstanding	Interest Rate	Annual Interest	Projected at December 2005 Outstanding	Interest Rate	Annual Interest
1.	Long-Term Debt:						
2.	L-T Senior Notes	$ 4,500,000	7.122%	$ 320,490	$ 4,500,000	7.122%	$ 320,490
3.	L-T Prommissory Note	25,000,000	4.920%	1,230,000	25,000,000	4.920%	1,230,000
4.	L-T Prommissory Note	3,500,000	5.710%	199,850	3,500,000	5.710%	199,850
5.	L-T Prommissory Note	154,948,119	5.710%	8,847,538	154,948,119	5.710%	8,847,538
6.	L-T Note - Maricopa	10,635,000	1.540%	163,779	10,635,000	1.540%	163,779
7.	PILR - Monterey	64,599	6.260%	4,044	64,599	6.260%	4,044
8.	PILR - Rosalee	60,873	7.180%	4,371	60,873	7.180%	4,371
9.	PILR - T.O. Development	49,463	7.180%	3,551	49,463	7.180%	3,551
10.	PILR - Montex/Lincoln	33,374	5.760%	1,922	33,374	5.760%	1,922
11.	L-T Prommissory Note				18,990,000	5.710%	1,084,329
12.	Total Long-Term Debt (a)	$ 198,791,428 (b)		$ 10,775,545	$ 217,781,428		$ 11,859,874
13.	Cost Rate (a)			5.42 %			5.45 %
14.	Short-Term Debt:	-		-	-		-
15.	Total Short-Term Debt	-		-	-		-
16.	Cost Rate						

Supporting Schedules: (b) E-1

Recap Schedules: (a) D-1

ARIZONA AMERICAN WATER COMPANY
COST OF PERFERRED STOCK
Test Year and Projected Year

At the end of the test year the Company had no preferred Stock issued, and is not planning to issue any in the future.

Supporting Schedules: (b) E-1

Recap Schedules: (a) D-1

ARIZONA AMERICAN WATER COMPANY
COST OF COMMON EQUITY
Test Year and Projected Year

See testimony of Dr. A. Lawrence Kolbe and Dr. Michael Vilbert.

Supporting Schedules:

Recap Schedules:

E SCHEDULES

ARIZONA AMERICAN WATER COMPANY
COMPARATIVE BALANCE SHEETS
Two Prior Years and Test Year

No.	ASSETS	Test Year at Dec. 2004	Prior Years at Dec. 2003	Prior Years at 12/31/02
1.	UTILITY PLANT			
2.	Plant in Service (a)	$ 463,942,604	$ 414,527,100	$ 337,726,564
3.	Const. Work in Progress	22,709,998	14,075,593	13,513,282
4.	Acquisition Adjustment	31,318,414	32,413,975	33,319,439
5.	Total	$ 517,971,016	$ 461,016,668	$ 384,559,285
6.	Accumulated Depreciation	93,569,772	81,338,557	71,181,624
7.	Depreciated Plant	$ 424,401,244	$ 379,678,111	$ 313,377,661
8.	NON UTILITY PROPERTY	$ 111,151	$ 124,643	$ 90,844
9.	OTHER INVESTMENTS	37,086,285	37,111,707	37,364,643
10.	CURRENT ASSETS			
11.	Cash	$ 6,124,265	$ 964,924	$ 1,764,426
12.	Accounts Recievable:			
13.	Customers	2,502,379	3,229,367	2,737,010
14.	Other	-	-	-
15.	Allowance for Uncollectibles	(52,276)	(34,040)	(3,258)
16.	Unbilled Revenues	3,894,041	2,922,746	1,200,089
17.	FIT refund due from assoc. companies	2,598,985	88,792	-
18.	Miscellaneous receivables	5,609,079	6,178,009	4,064,104
19.	Materials and Supplies	337,424	48,659	89,247
20.	Other	761,579	373,701	281,719
21.	Total Current Assets	$ 21,775,476	$ 13,772,158	$ 10,133,337
22.	DEFERRED DEBITS			
23.	Debt and preferred stock	$ 476,809	$ 525,005	$ 568,110
24.	Expense of Rate Proceedings	351,603	1,007,603	448,033
25.	Preliminary Survey	611,878	678,706	994,872
26.	Reg Asset - income tax recovery	1,017,069	673,589	322,096
27.	Other	5,732,557	5,362,093	6,241,581
28.	Total Deferred Debits	$ 8,189,916	$ 8,246,996	$ 8,574,692
29.	TOTAL ASSETS	$ 491,564,072	$ 438,933,615	$ 369,541,177

Notes: Arizona American consolidated
Supporting Schedules:

Recap Schedules: (b) A-3

ARIZONA AMERICAN WATER COMPANY
COMPARATIVE BALANCE SHEETS
Two Prior Years and Test Year

No.	LIABILITIES & STOCKHOLDER'S EQUITY	Test Year at Dec. 2004	Prior Years At Dec. 2003	Prior Years At 12/31/02
1.	STOCKHOLDER'S EQUITY			
2.	Common stock	$ 522,880	$ 522,880	$ 522,880
3.	Paid-in Capital	114,468,228	114,468,228	114,468,228
4.	Retained Earnings	419,248	324,565	446,297
5.	Total Common Equity	$ 115,410,356	$ 115,315,673	$ 115,437,405
6.	LONG TERM DEBT			
7.	Long Term debt	$ 198,772,252	$ 173,788,302	$ 173,803,348
8.	Capital Lease Olig.	-	4,628	21,057
9.	Total Long Term Debt	198,772,252	173,792,930	173,824,405
10.	Total Capitalization	$ 314,182,608	$ 289,108,603	$ 289,261,810
11.	CURRENT LIABILITIES			
12.	Bank Loans	$ 0	$ 15,429,146	$ 12,517,323
13.	Currnet Portion of LTD	19,176	15,046	14,109
14.	Current Cap Lease oblig.	4,627	18,038	17,167
15.	Accounts Payable	10,542,623	7,792,960	602,710
16.	Taxes Accrued	1,632,830	1,529,306	488,530
17.	Interest Accrued	1,276,936	1,296,017	1,258,145
18.	Customer Deposits	53,134	309,082	162,467
19.	Other Accrued Liabilities	8,431,114	6,799,288	6,532,468
20.	Total Current Lilbilities	$ 21,960,440	$ 33,188,883	$ 21,592,919
21.	DEFERRED CREDITS			
22.	Customer Advances for Const.	131,427,883	102,201,525	49,213,869
23.	Deferred Income Taxes	4,600,193	1,866,465	829,814
24.	Deferred Investment Tax Credits	71,266	74,986	78,706
25.	Reg Liab - Inc Tax Refundable thru Rates	285,882	330,090	373,800
26.	Other	2,562,194	1,785,464	608,505
27.	Total Deferred Credits	$ 138,947,418	$ 106,258,530	$ 51,104,694
28.	CONTRIBUTIONS IN AID OF CONST.	$ 16,473,607	$ 10,377,600	$ 7,581,753
29.	TOTAL	$ 491,564,073	$ 438,933,616	$ 369,541,176

Notes: Arizona American Consolidated
Supporting Schedules:

Recap Schedules: (b) A-3

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPARATIVE BALANCE SHEETS
Two Prior Years and Test Year

No.	ASSETS	Test Year at Dec. 2004	Prior Years at Dec. 2003	Prior Years at 12/31/02
1.	UTILITY PLANT			
2.	Plant in Service (a)	$ 29,404,906	$ 29,865,646	$ 31,075,999
3.	Net Reg Asset - AFUDC - Debt	950	1,022	1,094
4.	Const. Work in Progress	3,646,198	224,143	25,740
5.	Total	$ 33,052,054	$ 30,090,811	$ 31,102,832
6.	Accumulated Depreciation	9,883,836	8,776,547	7,790,741
7.	Depreciated Plant	$ 23,168,218	$ 21,314,265	$ 23,312,091
8.	NON UTILITY PROPERTY	$ 111,151	$ 124,643	$ 90,884
9.	CURRENT ASSETS			
10.	Cash	$ 432	$ 5,466	$ 6,425
11.	Accounts Recievable:			
12.	Customers	-	-	(787,779)
13.	Accrued utility revenue	345,463	298,696	180,650
14.	FIT refund due from assoc. companies	2,131,982	88,792	-
15.	Miscellaneous receivables	-	644,000	(25)
16.	Prepayments	246,442	24,906	226,015
17.	Materials and Supplies	-	33,552	40,862
18.	Other	-		255,229
19.	Total Current Assets	$ 2,724,319	$ 1,095,412	$ (78,624)
20.	DEFERRED DEBITS			
21.	Deferred regulatory asset	1,017,133	673,589	322,096
22.	Deferred debit - Acquisition Costs	92,528	99,098	105,668
23.	Other	771,943	922,164	1,519,035
24.	Total Deferred Debits	$ 1,881,603	$ 1,694,851	$ 1,946,798
25.	TOTAL ASSETS	$ 27,885,291	$ 24,229,170	$ 25,271,149

Notes: Paradise Valley operates as a division of Arizona American Water, and as such, does not have a separate and distinct capitalization.
Supporting Schedules: (a) E-5 Recap Schedules: (b) A-3

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPARATIVE BALANCE SHEETS
Two Prior Years and Test Year

No.	LIABILITIES & STOCKHOLDER'S EQUITY	Test Year at Dec. 2004	Prior Years At Dec. 2003	Prior Years At 12/31/02
1.	STOCKHOLDER'S EQUITY			
2.	Common stock	$ 522,880	$ 522,880	$ 522,880
3.	Paid-in Capital	114,468,228	114,468,228	114,468,228
4.	Retained Earnings	610,260	446,297	1,809,824
5.	Total Common Equity	$ 115,601,368	$ 115,437,405	$ 116,800,932
6.	LONG TERM DEBT	$ -	$ 4,628	$ 21,057
7.	Total Capitalization	$ 115,601,368	$ 115,442,033	$ 116,821,989
8.	CURRENT LIABILITIES			
9.	Bank Loans	$ -	$ 85,898	$ (1,866,769)
10.	Currnet Portion of LTD	4,627	18,038	17,167
11.	Accounts Payable	1,296,251	1,891,135	6,253
12.	Taxes Accrued	204,853	749,509	(289,891)
13.	Interest Accrued	-	5,055	(21,835)
14.	Customer Deposits	3,500	(2,533)	(1,133)
15.	Other Accrued Liabilities	759,282	2,217,830	44,631,462
16.	Total Current Libilities	$ 2,268,514	$ 4,964,932	$ 42,475,254
17.	DEFERRED CREDITS			
18.	Customer Advances for Const.	635,912	580,642	568,098
19.	Deferred Income Taxes	1,139,528	1,866,465	829,814
20.	Deferred Investment Tax Credits	71,266	74,986	78,706
21.	Reg Liab - Inc Tax Refundable thru Rates	-	330,090	373,800
22.	Other	66,502	145,061	587,253
23.	Total Deferred Credits	$ 1,913,208	$ 2,997,243	$ 2,437,671
24.	CONTRIBUTIONS IN AID OF CONST.	$ 6,486,559	$ 7,011,579	$ 7,534,226
25.	TOTAL	$ 126,269,649	$ 130,415,787	$ 169,269,140

Notes: Paradise Valley operates as a division of Arizona American Water, and as such, does not have a separate and distinct capitalization.
Supporting Schedules: (a) E-5

Recap Schedules: (b) A-3

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPARATIVE INCOME STATEMENTS
Two Prior Years and Test Year

Line No.	DESCRIPTION	Test Year at Dec. 2004	Prior Years At Dec. 2003	Prior Years At 12/31/2002
1.	OPERATING REVENUES (a)	$ 5,422,284	$ 5,815,830	$ 5,680,804
2.	OPERATING EXPENSES			
3.	Operations	2,601,346	2,984,731	3,304,048
4.	Maintenance	345,581	652,496	316,529
5.	Depreciation	781,105	655,812	911,985
6.	Taxes:			
7.	General	279,018	244,731	221,044
8.	State Income	61,388	53,705	30,099
9.	Federal Income	278,670	243,790	136,633
10.	Total Operating Expenses (a)	4,347,108	4,835,264	4,920,339
11.	OPERATING INCOME (a)	$ 1,075,176	$ 980,566	$ 760,465
12.	OTHER INCOME AND DEDUCTIONS[1]			
13.	AFUDC[2]	$ 66,439	$ 40,651	$ 119,451
14.	Misc. Other Income	-	8,596	34
15.	Misc. Other Deductions	-	10,029	14,945
16.	Taxes on Other Income	-	-	-
17.	Total Other Income	66,439	39,218	104,540
18.	INCOME BEFORE INTEREST CHARGES	$ 1,141,615	$ 1,019,784	$ 865,005
19.	INTEREST CHARGES			
20.	Interest on Long-Term Debt	534,228	507,339	508,262
21.	Interest on Short-Term Debt	-	-	-
22.	Other Interest	-	(13.0)	(13,026.0)
23.	Total Interest Charges	534,228	507,326	495,236
24.	NET INCOME	$ 607,386	$ 512,457	$ 369,770
25.	Average Common Shares Outstanding	166,163	166,163	166,163
26.	Earnings Per Average Share of			
27.	Common Stock Outstanding	$ 3.66	$ 3.08	$ 2.23

Notes:
[1]Arizona American Water recorded additional Other Income of $783,365 related to the sale of property in 2004.
[2]Arizona American Water recorded $359,806 in AFUDC earnings, $293,367of which was not related to Paradise Valley.

Supporting Schedules: (a) E-6

Recap Schedules: A-2

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPARATIVE STATEMENT OF CHANGES IN FINANCIAL POSITION
Two Prior Years and Test Year

Line No.	DESCRIPTION	Test Year at Dec. 2004	Prior Years Ended Dec. 2003	Prior Years Ended 12/31/02
1.	SOURCE OF FUNDS			
2.	From Operations			
3.	Net Income	$ 607,386	$ 512,457	$ 369,770
4.	Depreciation Expense	781,105	655,812	911,985
5.	Customer Advances and Contributions	(469,749)	(510,104)	(747,426)
6.	Def. Investment Tax Credits	(3,720)	(3,720)	(3,720)
7.	Deferred Income Taxes	(1,057,027)	992,941	(453,766)
8.	Amort. of Regulatory Expense	-	-	-
9.	Outside Financing	8,689,936	(5,539,752)	1,878,658
10.	Other-Net			
11.	Totals	$ 8,547,930	$ (3,892,366)	$ 1,955,501
12.	Decrease (Increase) in Working Capital	(4,325,325)	4,447,104	(1,271,084)
13.	TOTAL FUNDS PROVIDED	$ 4,222,605	$ 554,738	$ 684,417
14.	APPLICATION OF FUNDS			
15.	Construction Expenses	$ 4,032,377	$ 360,640	$ 691,386
16.	Def. Costs of Condemnations	-	-	-
	Rate Case Expenses	-	-	-
17.	Preliminary Survey	-	-	-
18.	Dividends	455,540	384,343	277,327
19.	Other Deferred debits & credits	(265,311)	(190,244)	(284,296)
20.	Outisde Financing	-	-	-
21.	TOTAL FUNDS APPLIED	$ 4,222,606	$ 554,739	$ 684,418

Supporting Schedules:

Recap Schedules: A-5

ARIZONA AMERICAN WATER COMPANY
STATEMENT OF CHANGE IN STOCKHOLDER'S EQUITY
Two Prior Years and Test Year

Line No.	DESCRIPTION	COMMON STOCK SHARES	COMMON STOCK AMOUNT	ADDITIONAL PAID-IN CAPITAL	RETAINED EARNINGS	TOTAL
1.	Balance, 12/31/01	166,163	$ 522,880	$ 3,580,070	$ 1,809,824	$ 5,912,774
				110,888,158		
2.	2002 Net Earnings					(1,363,524)
3.	Cash Dividends, Common					-
4.	Balance, 12/31/02	166,163	$ 522,880	$ 114,468,228	$ 446,297	$ 115,437,405
				-		
5.	2003 Net Earnings					821,545
6.	Cash Dividends, Common					943,276
7.	Balance, Dec. 2003	166,163	$ 522,880	$ 114,468,228	$ 324,565	$ 115,315,673
				-		
8.	2004 Net Earnings					94,680
9.	Cash Dividends, Common					-
10.	Balance, Dec. 2004	166,163	$ 522,880	$ 114,468,228	$ 419,248	$ 115,410,356

Supporting Schedules: Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
DETAIL OF UTILITY PLANT
Prior Year and Test Year

Line No.	NARUC Acct. No.	American Acct. No.	DESCRIPTION	END OF TEST YEAR AT Dec. 2004	NET ADDITIONS	END OF PRIOR YEAR AT Dec. 2003
1.			WATER PLANT			
2.	100.4	103000.000000	Property Held For Future Use	$ 138,682	$ -	$ 138,682
3.	301	101000.301000	Organization	15,350	(624,427)	639,777
4.	303.5	101000.303500	Dist. Res. & Standpipe Land	8,324	-	8,324
5.	304.1	101000.304100	SS Structures & Improvements	7,953	-	7,953
6.	304.2	101000.304200	Pumping Structures & Improve	69,131	-	69,131
7.	304.3	101000.304300	WT Structures & Improvements	3,038,848	(3,501)	3,042,349
8.	304.4	101000.304400	Grit Removal Equipment	23,864	-	23,864
9.	304.5	101000.304500	Struct & Imp AG	15,173	-	15,173
10.	304.7	101000.304700	Stores Shop & Gar. Structures	93,285	-	93,285
11.	304.8	101000.304800	Struct & Imp Misc	149,284	-	149,284
12.	307.0	101000.307000	Wells & Springs	1,252,563	-	1,252,563
13.	311.2	101000.311200	Elec Pumping Equipment	3,337,081	73,991	3,263,090
14.	311.3	101000.311300	Diesel Pumping Equipment	59,421	-	59,421
15.	320.0	101000.320100	Water Treatment Equipment	5,825,149	-	5,825,149
16.	330.0	101000.330000	Dist Reservoirs & Standpipes	912,619	-	912,619
17.	331.1	101000.331100	T & D Mains - 4" & Less	706,252	(5,771)	712,023
18.	331.2	101000.331200	T & D Mains - 6" - 8"	3,974,977	60,319	3,914,659
19.	331.3	101000.331300	T & D Mains - 10" or More	5,485,424	-	5,485,424
20.	333.0	101000.333000	Services	2,178,857	88,011	2,090,845
21.	334.0	101000.334100	Meters	328,579	(20,685)	349,265
22.	334.0	101000.334200	Meter Installations	103,799	15,255	88,544
23.	335.0	101000.335000	Hydrants	746,904	15,418	731,486
24.	339.0	10100.339600	Other P/e CPS	0	(32,634)	32,634
25.	340.1	101000.340100	Office Furniture	43,931	-	43,931
26.	340.2	101000.340200	Computers & Peripherals	98,019	(2,180)	100,200
27.	340.3	101000.340300	Computer Software	134,174	-	134,174
28.	340.5	101000.340500	Other Office Equipment	25,224	-	25,224
29.	341.1	101000.341100	Trans. Equip. - Light Trucks	2,882	(26,416)	29,298
30.	341.3	101000.341300	Trans. Equip. - Automobiles	19,307	-	19,307
31.	341.4	101000.341400	Trans. Equip. - Other	13,606	-	13,606
32.	343.0	101000.343000	Tools Shop & Garage Equipment	83,291	1,880	81,411
33.	345.0	101000.345000	Power Operated Equipment	147,066	-	147,066
34.	346.0	101000.346100	Communication Equipment	284,556	-	284,556
35.	346.3	10100.346300	Comm Equip Other	81,331	-	81,331
36.			TOTAL PLANT IN SERVICE	$ 29,404,906	$ (460,740)	$ 29,865,646
37.			ACCUMULATED DEPRECIATION	$ 9,883,836	$ 1,107,289	$ 8,776,547
38.			Net Plant In Service	$ 19,521,070	$ (1,568,030)	$ 21,089,099
39.			Construction Work In Progress	3,646,198	3,422,055	224,143
40.			TOTAL NET PLANT	$ 23,167,268	$ 1,854,025	$ 21,313,243

Supporting Schedules:

Recap Schedules: E-1, A-4

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
COMPARATIVE DEPARTMENTAL OPERATING INCOME STATEMENTS
Two Prior Years and Test Year

Line No.	DESCRIPTION	Test Year at 12/2004	Prior Years At 12/2003	Prior Years At 12/31/02
1.	OPERATING REVENUES			
2.	Residential	$ 3,845,144	$ 3,660,510	$ 3,766,295
3.	Commercial	1,150,396	1,088,535	1,189,810
4.	Fire Service	4,442	3,797	4,581
5.	Public Authority	8,873	9,650	14,908
6.	Sales For Resale	13,270	11,834	9,107
7.	Miscellaneous	924	865	7,576
8.	Unbilled Adjustment	46,767	262,875	23,550
9.	Total Water Sales	5,069,816	5,038,066	5,015,827
10.	Other Revenues	352,468	777,764	664,977
11.	TOTAL OPERATING REVENUES	$ 5,422,284	$ 5,815,830	$ 5,680,804
12.	OPERATING EXPENSES			
13.	Source of Supply Expenses	$ 70,292	$ 20,012	$ 165,564
14.	Pumping Expenses			
15.	Purchased Power	952,963	1,327,119	1,129,243
16.	Pumping Expense	4,416	866	1,397
17.	Total Pumping Expense	$ 957,379.00	$ 1,327,985	$ 1,130,640
18.	Water Treatment Expenses			
19.	Chemicals	16,499	37,216	8,017
20.	Water Treatment Expense	65,885	171,961	243,939
21.	Total Water Treatment	$ 82,384	$ 209,177	$ 251,956
22.	Transmission & Distribution Expense	74,437	176,801	94,552
23.	Customer Accounting Expense	62,854	80,326	377,315
24.	Administrative & General	913,274	802,639	920,538
25.	Operations Labor	440,726	367,791	363,483
26.	TOTAL OPERATION EXPENSE	$ 2,601,346	$ 2,984,731	$ 3,304,048

Supporting Schedules:

Recap Schedules: E-2

Line No.	DESCRIPTION	Test Year at 12/2004	Prior Years At 12/2003	12/31/02
1.	MAINTENANCE EXPENSES			
2.	Source of Supply	$ 14,552	$ 42,814	$ 29,972
3.	Pumping	16,309	9,338	43,361
4.	Water Treatment	77,952	375,918	20,930
5.	Transmission & Distribution	140,049	102,332	119,005
6.	Administrative & General	784	10,953	3,122
7.	Maintenance Labor	95,935	111,141	100,139
8.	TOTAL MAINTENANCE EXPENSES	$ 345,581	$ 652,496	$ 316,529
9.	TOTAL OPERATION & MAINTENANCE EXPENSES	$ 2,946,927	$ 3,637,227	$ 3,620,577
10.	DEPRECIATION & AMORTIZATION EXPENSE	781,105	655,812	911,985
11.	TAXES			
12.	Property Taxes	228,120	210,001	174,928
13.	Payroll & Miscellaneous	50,898	34,730	46,116
14.	State Income	61,388	53,705	30,099
15.	Federal Income	278,670	243,790	136,633
16.	TOTAL TAXES	$ 619,076	$ 542,226	$ 387,777
17.	TOTAL OPERATING EXPENSES	$ 4,347,108	$ 4,835,264	$ 4,920,339
18.	OPERATING INCOME	$ 1,075,176	$ 980,566	$ 760,465

Supporting Schedules:

Recap Schedules: E-2

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
OPERATING STATISTICS
Two Prior Years and Test Year

Line No.	WATER STATISTICS	Test Year at Dec. 2004	Prior Years At Dec. 2003	Prior Years At 12/31/02
1.	T GALLONS SOLD BY REVENUE CLASS			
2.	Residential	2,281,374	2,200,796	2,256,577
3.	Commercial - Included in Turf	639,090	622,032	667,311
4.	Fire Service	-	5	65
5.	Public Authority - Included in Turf	-	-	-
6.	Sales for Resale	6,780	5,756	4,383
7.	Miscellaneous	-	2	(69,563)
8.	P.V. Country Club	203,063	200,949	239,352
9.	Turf	83,085	52,747	88,595
10.				
11.				
12.	TOTAL M GALLONS SOLD	3,213,392	3,082,287	3,186,720
13.	AVERAGE NUMBER OF CUSTOMERS			
14.	Residential	4,342	4,338	4,348
15.	Commercial - 1 Included in Turf	209	238	239
16.	Fire Service	75	75	70
17.	Public Authority - 1 Included in Turf	0	1	10
18.	Sales for Resale	19	19	19
19.	Miscellaneous	1	-	-
20.	P.V. Country Club	1	1	1
21.	Turf	2	2	2
22.				
23.				
24.	TOTAL AVERAGE CUSTOMERS	4,649	4,674	4,689
25.	AVERAGE ANNUAL M GALLONS SOLD PER			
26.	RESIDENTIAL CUSTOMER	525.4	507.3	519.1
27.	AVERAGE ANNUAL REVENUE PER	$ 885.5	$ 843.81	$ 866.31
28.	RESIDENTIAL CUSTOMER			
29	PUMPING COST PER 1,000 GALLONS	$ -	$ -	$ -

Supporting Schedules:

Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
TAXES CHARGED TO OPERATIONS
Two Prior Years and Test Year

Line No.	DESCRIPTION	Test Year at Dec. 2004	Prior Years At Dec. 2003	Prior Years At 12/31/02
1.	FEDERAL TAXES			
2.	Federal Income Taxes	$ 278,670	$ 243,790	$ 136,633
3.	FICA Taxes (Employer's)	49,370	35,028	35,744
4.	Federal Unemployment Tax	608	389	521
5.	Environmental Tax	-	-	-
6.	TOTAL FEDERAL TAXES	$ 328,648	$ 279,207	$ 172,898
7.	STATE TAXES			
8.	State Income Taxes	61,388	53,705	30,099
9.	Property Taxes	228,120	210,001	174,928
10.	State Unemployment Taxes	775	(687)	295
	Other General Taxes	145	-	9,556
11.	TOTAL STATE TAXES	$ 290,428	$ 263,019	$ 214,878
12.	TOTAL TAXES	$ 619,076	$ 542,226	$ 387,777

Supporting Schedules:

Recap Schedules:

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
NOTES TO FINANCIAL STATEMENTS
Test Year 12 Months Ended DECEMBER, 2004

DISCLOSURES

None.

Supporting Schedules:

Recap Schedules:

F SCHEDULES

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
PROJECTED INCOME STATEMENTS- PRESENT AND PROPOSED RATES

Line No.	DESCRIPTION	(a) Actual Test Year Dec. 2004	Projected Year At Present Rates Year Dec. 2004	(b) At Proposed Rates Year Dec. 2004
1.	OPERATING REVENUES	$ 5,422,284	$ 5,070,680	$ 5,348,660
2.	OPERATING EXPENSES			
3.	Operations	2,601,346	2,826,742	2,826,742
4.	Maintenance	345,581	296,930	296,930
5.	Depreciation	781,105	720,578	720,578
6.	TAXES			
7.	Property Tax	228,120	213,241	213,241
8.	Payroll	50,898	54,716	54,716
9.	State Income	61,388	38,940	58,309
10.	Federal Income	278,670	176,765	264,692
11.	TOTAL OPERATING EXPENSES	$ 4,347,108	$ 4,327,912	$ 4,435,209
12.	OPERATING INCOME	$ 1,075,176	$ 742,769	$ 913,452 (c)
13.	OTHER INCOME			
14.	Misc. Other Income	-	-	-
15.	AFUDC	66,439	-	-
16.	Misc. Other Deductions	-	-	-
17.	Taxes	-	-	-
18.	TOTAL OTHER INCOME	$ 66,439	$ -	$ -
19.	GROSS INCOME	$ 1,141,615	$ 742,769	$ 913,452
20.	INCOME DEDUCTIONS			
21.	Interest Expense	534,228	399,637	399,637
22.	NET INCOME	$ 607,386	$ 343,132	$ 513,815
23.	Earnings per Share of Common Stock	3.66	2.07	3.09
24.	% Return on Common Equity	14.19%	8.02%	12.01%

Supporting Schedules: (a) E-2

Recap Schedules: (b) A-2

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
PROJECTED CHANGES IN FINANCIAL POSITION
PRESENT AND PROPOSED RATES

Line No.	DESCRIPTION	Test Year Ended Dec. 2004	Projected Year At Present Rates Year Ended Dec. 2005	Projected Year At Proposed Rates Year Ended Dec. 2005
	Source of Funds			
1.	Operation	$ (4,467,331)	$ 87,901	$ 130,573
2.	Outside Financing	8,689,936	13,801,375	13,758,703
3.	Other	-	-	-
4.	Total Funds Provided	$ 4,222,605	$ 13,889,276	$ 13,889,276
	Application of Funds			
5.	Construction Expenditures	$ 4,032,377	$ 13,868,312	$ 13,868,312
6.	Outside Financing	-	-	-
7.	Other	190,229	20,964	20,964
8.	Total Funds Applied	$ 4,222,606	$ 13,889,276	$ 13,889,276
	Details of Financing:			
9.	Changes in Short-term Debt	8,689,936	13,801,375	13,758,703
10.	Changes in Long-Term Debt	-	-	-
11.	Changes in Preferred Stock	-	-	-
12.	Changes in Common Equity	-	-	-

Supporting Schedules: (a) E-3, (b) F-3

Recap Schedules: (b) A-5

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
PROJECTED CONSTRUCTION REQUIREMENTS
Test Year And Three Projected Years

Line No.	DESCRIPTION	Actual Test Year Ended Dec. 2004	Projected Test Year Ended Dec. 2005	Projected Test Year Ended Dec. 2006	Projected Test Year Ended Dec. 2007
1.	Production Plant	$ -	$ -	$ -	$ 944,425
2.	Water Treatment Plant	1,237,615	10,725,051	7,649,699	-
3.	Transmission & Dist. Plant	2,018,470	3,143,261	2,964,120	3,046,414
4.	General Plant	776,292	-	-	-
5.	TOTAL PLANT (a)	$ 4,032,377	$ 13,868,312	$ 10,613,819	$ 3,990,839

Supporting Schedules

Recap Schedules: (a) F-2, A-4

ARIZONA AMERICAN WATER COMPANY
PARADISE VALLEY DISTRICT
ASSUMPTIONS USED IN DEVELOPING PROJECTIONS
Test Year 12 Months Ended DECEMBER, 2004

ASSUMPTIONS

A) Customer Growth:

n/a

B) Growth in Consumption and Customer Demand:

n/a

C) Changes in Expenses:

D) Construction Requirements Including Production Reserves and Changes in Plant Capacity:

Construction of facilities to bring Paradise Valley into compliance with the Federal mandate for meeting reduced arsenic levels in drinking water; and the need to upgrade the existing distribution system in Paradise Valley to provide improved fire flow capacity.

E) Capital Structure Changes:

The assumption made in developing the projected Capital Structure change was that equity and debt may be issued for the purposes of funding capital improvements.

F) Financing Costs, Interest Rates:

Arizona American Water's November 2001 and January 2002 bonds become due and payable in November 2006, and will need to be refinanced. The current borrowing rate is 70 basis points above the current yield on equivalent maturity U.S. Treasury securities.

Supporting Schedules: Recap Schedules: